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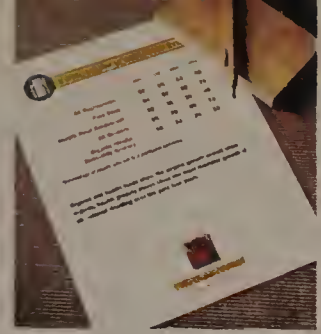

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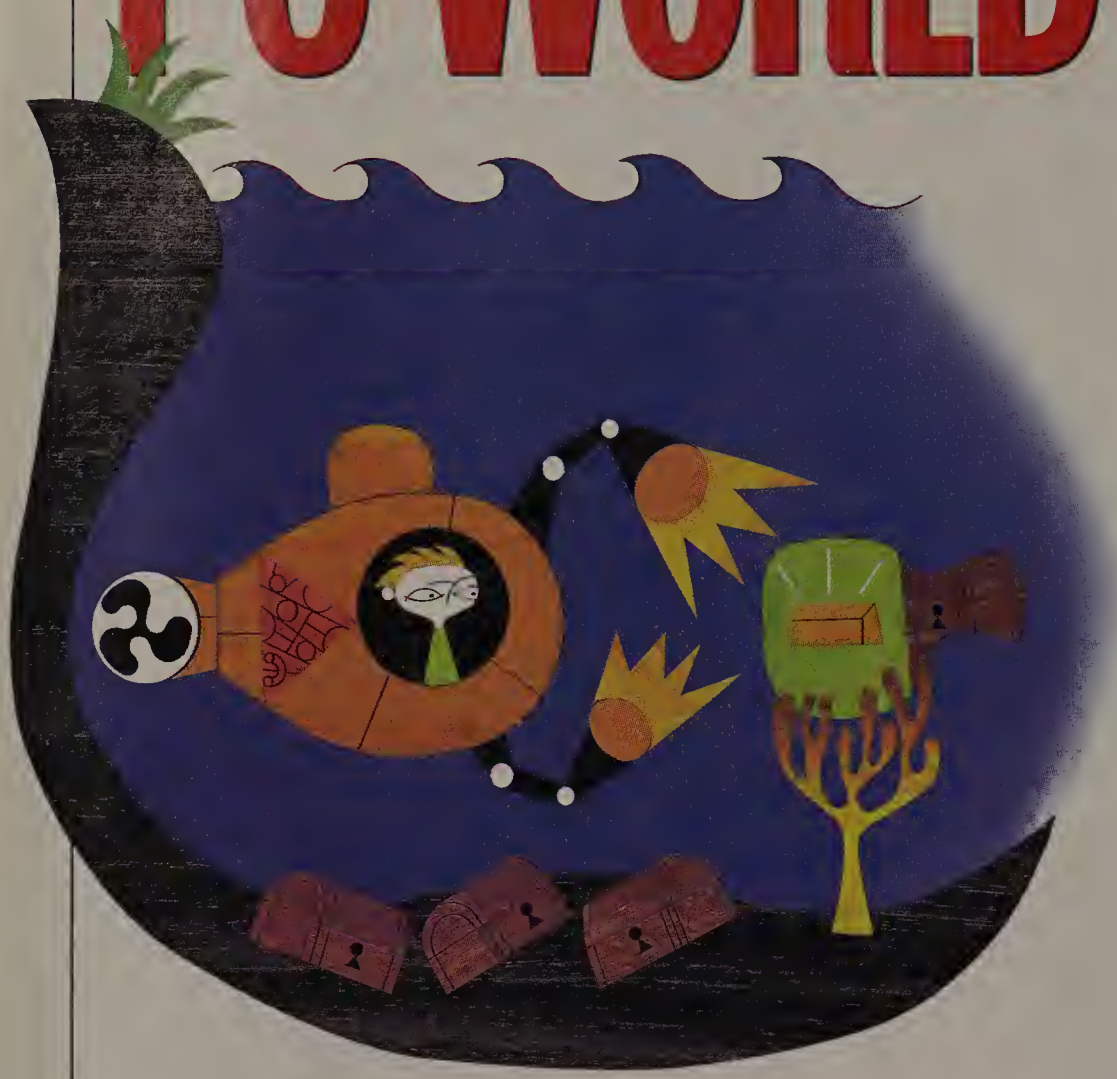

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Cover photography by Marc Simon; digital composition by DPI

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150 Software Suites for Windows 95, Round II
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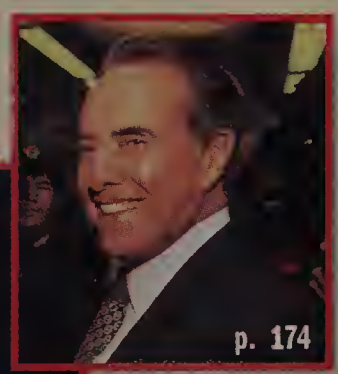
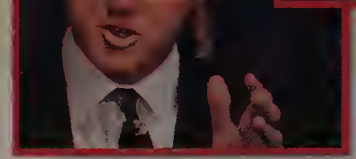
How satisfied are you with your PC? Fax in this survey for a chance to win a DTK Quin 5M/P100, a Best Buy this month.





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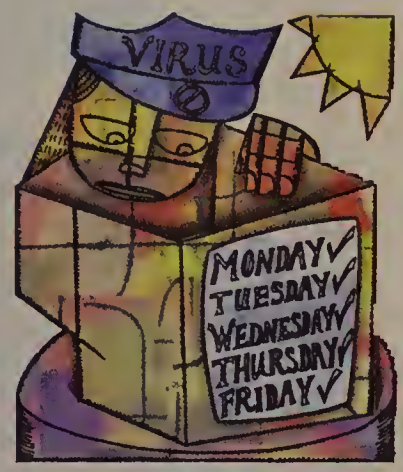

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Finally, a multimedia notebook powerful enough to replace your desktop.

The Millennia TransPort™

PC World reports in its March 1996 issue that *"...this Pentium 120 ran the new PC WorldBench tests faster than any other notebook we've measured..."* The April 1996 *Windows Sources* says, *"The Millennia TransPort, a bench-burner of a notebook...delivered the highest Winstone 96 score we've ever seen on a notebook: 53.3."*

Feature for feature this notebook gives you everything you need—whether you're working on the road or at your desk. According to *PC World*, *"If you have a 75, 90, or 100MHz Pentium PC on your desk, it will fairly crawl compared to Micron's Millennia TransPort."*
—*PC World*, March 1996

Performance that will take you where you want to go! *"Replace your desktop PC and your notebook with the Millennia TransPort? It might just be an even trade."*
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Start with blistering speed—133MHz mobile Intel Pentium® processor—add 256KB of pipelined burst cache and 16MB EDO memory and you've got all the power you need to conceive and execute the most sophisticated multimedia presentation.

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Product protection that's second to none. Micron is so confident in the design and construction of the Millennia TransPort that it's offering an industry first—the Micron Power℠ warranty*. It includes a five-year limited warranty on the microprocessor and main memory and a three-year limited parts-only system warranty.

The March 1996 *PC World* says, *"If you believe this notebook is only for engineers or lucky CEO's, think again..."* Go with the notebook that outperforms the rest—the Millennia TransPort from Micron.

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"An excellent entry into the mobile Pentium fray, Micron's Millennia TransPort offers a solid blend of features, performance, and design."
—*Windows Sources*, April 1996

Specifications

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- Intel 430MX PCIset
- 256KB L2 pipelined burst cache
- EDO memory (48MB max.)
- 4X modular CD-ROM drive
- 11.3" SVGA color display, 800 x 600
- PCI graphics accelerator, 1MB RAM
- Pick-a-Point™ dual pointing devices integrate both pointing stick and touchpad
- Removable EIDE hard drive (1.2GB max.)
- 3.5" modular floppy drive
- Intelligent modular lithium-ion battery
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- Built-in stereo speakers and microphone
- 2 Type II or one Type III PCMCIA slots
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- Headphone, microphone and line-in jacks
- 2 infrared ports, one front, one back
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- 5-year/3-year Micron Power℠ warranty*

Micron Millennia TransPort P133
- Intel 133MHz Pentium processor
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- 2nd intelligent modular lithium-ion battery
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intel inside pentium PROCESSOR

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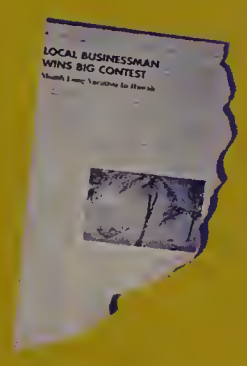

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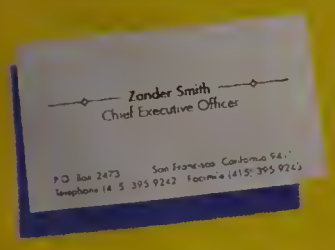

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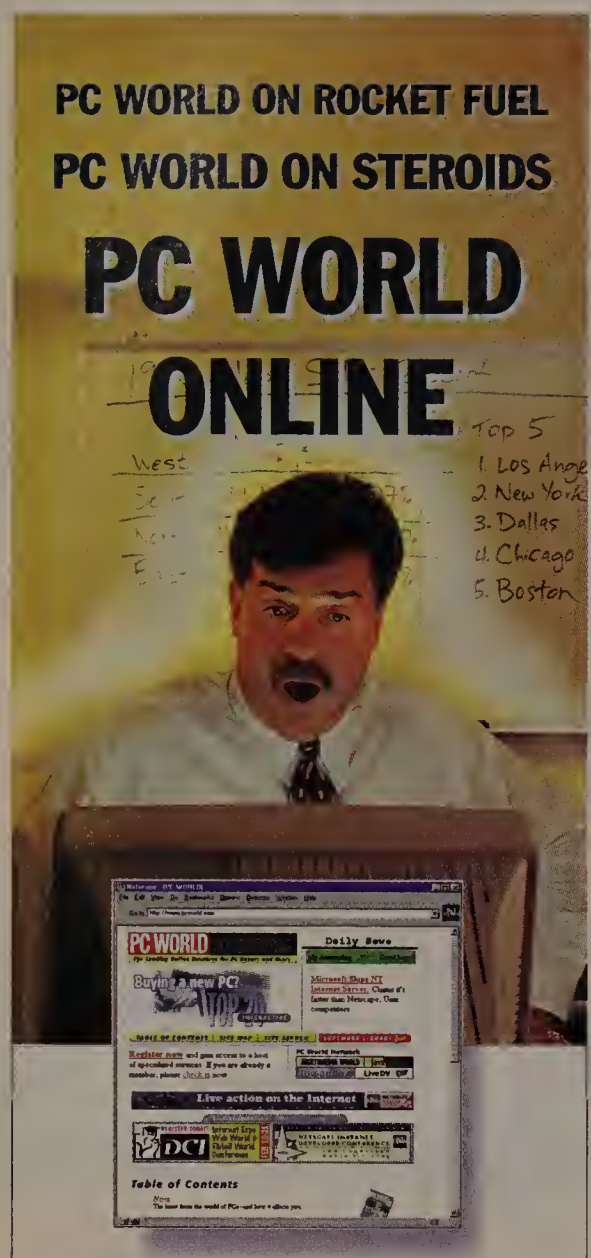

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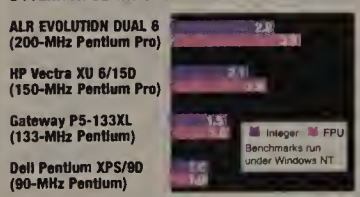

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Our engineers blew out a few pocket protectors on this one.

To say that ViewSonic's new SonicTron™ PT810 21" (19.5" viewable) monitor has a great picture hardly does it justice. Actually, it's way better than great. Even the most particular CAD/CAM/CAE users and desktop publishers are staring in wide-eyed amazement.

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Other SonicTron pluses include Plug & Play+ for automatic configuration of the graphics controller. It's both PC and MAC® compatible and is available in a 17" (16" viewable) configuration as well as 21" (19.5" viewable). And it also comes with a limited 3 year warranty on parts, CRT and labor.*

"A star among stars."

Recently, CADalyst magazine put our PT810 SonicTron monitor through its paces and then told their readers what they thought of it.

Here's what they said: "Great image quality. Your eyes will really appreciate this monitor after hours of use." And, "It sets the standard for image adjustment and timing storage capabilities." As for its cons, they found "non significant."

They concluded by giving it 5 stars, their highest rating.

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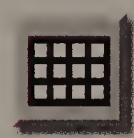

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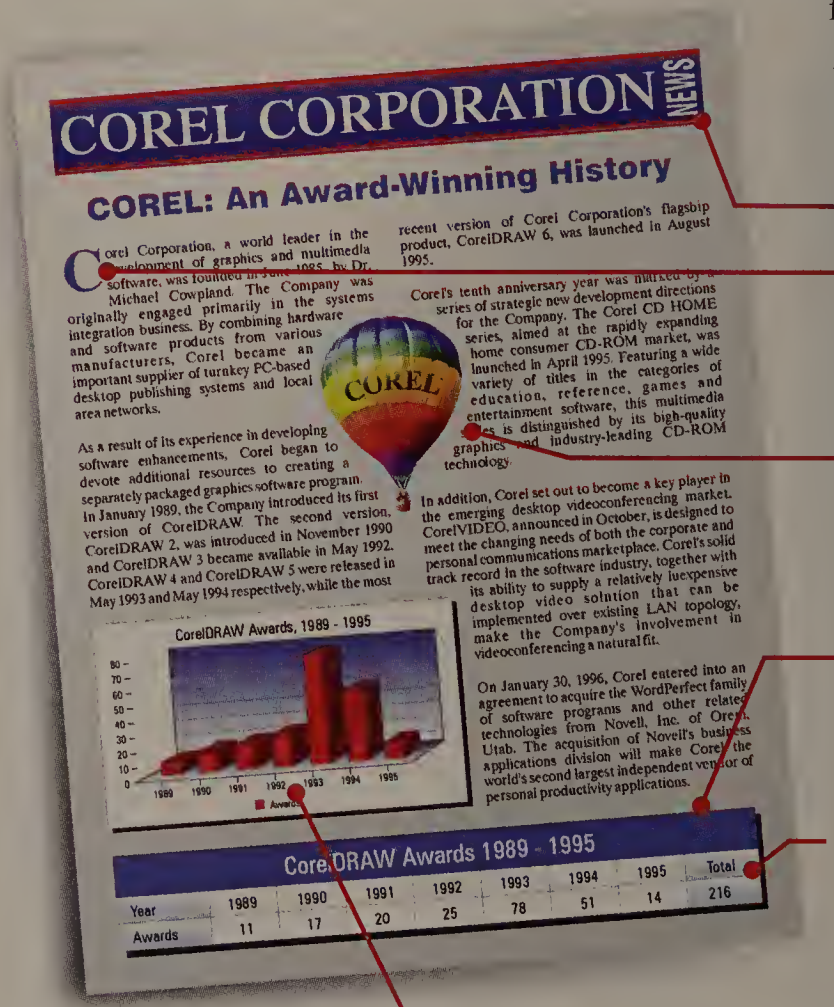

COREL CORPORATION NEWS

COREL: An Award-Winning History

Corel Corporation, a world leader in the development of graphics and multimedia software, was founded in June 1985 by Dr. Michael Cowpland. The Company was originally engaged primarily in the systems integration business. By combining hardware and software products from various manufacturers, Corel became an important supplier of turnkey PC-based desktop publishing systems and local area networks.

As a result of its experience in developing software enhancements, Corel began to devote additional resources to creating a separately packaged graphics software program. In January 1989, the Company introduced its first version of CorelDRAW. The second version, CorelDRAW 2, was introduced in November 1990 and CorelDRAW 3 became available in May 1992. CorelDRAW 4 and CorelDRAW 5 were released in May 1993 and May 1994 respectively, while the most recent version of Corel Corporation's flagship product, CorelDRAW 6, was launched in August 1995.

Corel's tenth anniversary year was initiated by a series of strategic new development directions for the Company. The Corel CD HOME series, aimed at the rapidly expanding home consumer CD-ROM market, was launched in April 1995. Featuring a wide variety of titles in the categories of education, reference, games and entertainment software, this multimedia series is distinguished by its high-quality graphics and industry-leading CD-ROM technology.

In addition, Corel set out to become a key player in the emerging desktop videoconferencing market. CorelVIDEO, announced in October, is designed to meet the changing needs of both the corporate and personal communications marketplace. Corel's solid track record in the software industry, together with its ability to supply a relatively inexpensive desktop video solution that can be implemented over existing LAN topology, make the Company's involvement in videoconferencing a natural fit.

On January 30, 1996, Corel entered into an agreement to acquire the WordPerfect family of software programs and other related technologies from Novell, Inc. of Orem, Utah. The acquisition of Novell's business applications division will make Corel the world's second largest independent vendor of personal productivity applications.

CorelDRAW Awards, 1989 - 1995

CorelDRAW Awards 1989 - 1995

Year	1989	1990	1991	1992	1993	1994	1995	Total
Awards	11	17	20	25	78	51	14	216

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WordPerfect 6.1 beats Microsoft Word for Windows® 95 for Editor's Choice.
PC Magazine, November, 1995

WordPerfect 3.5 for Macintosh® beats Microsoft Word for Macintosh for *MacUser* 1995 Editor's Choice Award.
MacUser, December, 1995

WordPerfect 6.1 for DOS receives Editor's Choice Award.
PC Magazine, November, *1995*

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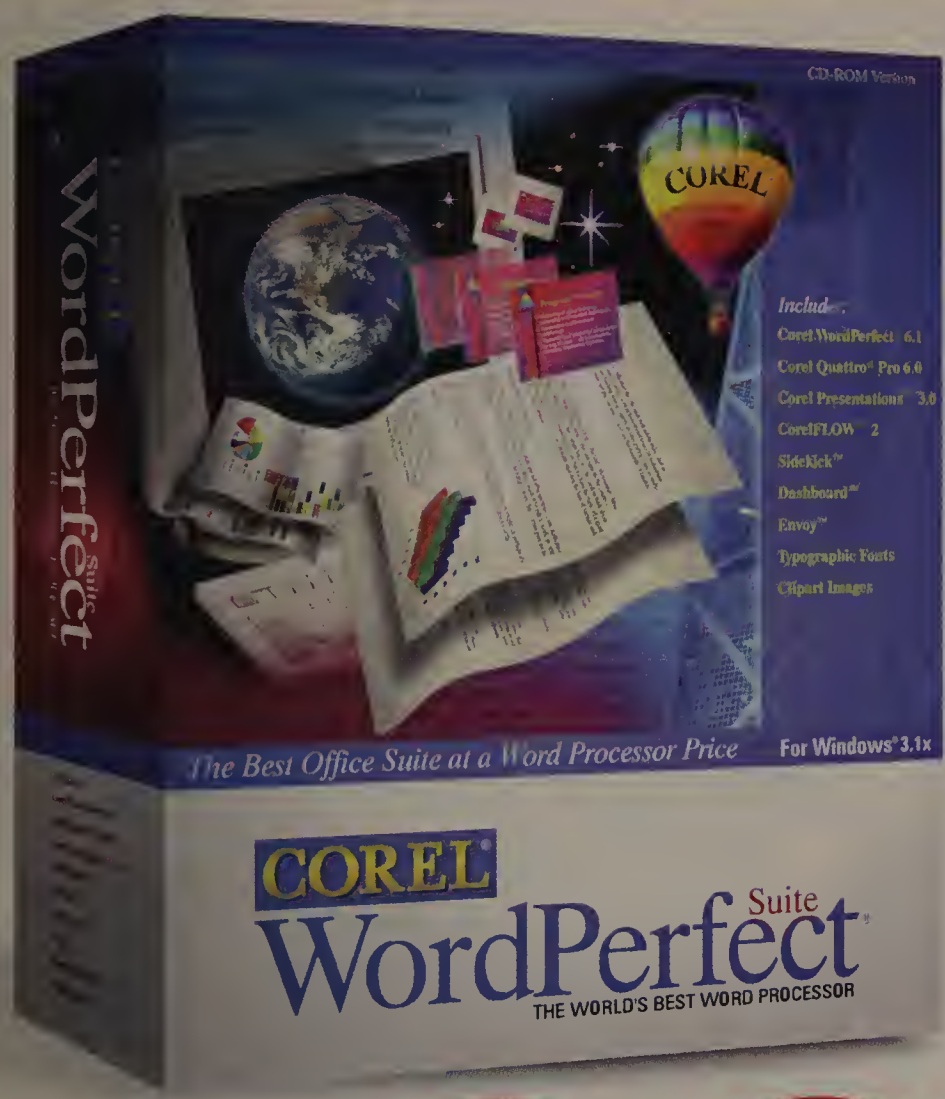

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PC Week, February 1995

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The Best Free Stuff Online—and Then Some

A *PC World* editor, who will remain anonymous, is a tightwad of the finest sort—extremely frugal and equally generous. Count on him to nail the best bargains around—whether in stores, through mail-order catalogs, or online—and to share those discoveries with all who will listen. Who better, we thought, to edit this month's cover story, "The Best Free Stuff Online"?

The result of his obsession: a bargain-lover's guide to 50 Internet sites that offer great values for the price of your time online. Included are the five best shareware libraries, plus sources of computer help, business directories and resources, the best free search tools, job-hunting and related services, and of course, a handful of sites dedicated to "freebies," the Holy Grail of die-hard bargain hunters. Among the giveaways: free Internet time, a rebate coupon for HBO, trial issues of the *Wall Street Journal*, and for the truly shameless, a sample tube of Rembrandt toothpaste.

For accessing the shareware, services, and yes, the toothpaste, the quickest route is through PC World Online on the World Wide Web (http://www.pcworld.com). You'll find the full article there, with hot links directly to each site to save you both time and money.

PC World Online, Version 2.0

When checking out these sites, take some time to look around the rest of *PC World*'s Web site, which has a new look, a revamped format, and some very cool interactive tools. The site now organizes all of *PC World*'s content by product category rather than by issue, making it easier to find the information you're after. Start at *Hardware*, for instance, click next on *Hard Drives, Storage, and Backup*, and you'll pull up a list of articles in current and back issues related to the topic at hand. Even quicker is Site Search, a tool that not only retrieves a list of all *PC World* documents that meet your criteria but also ranks the documents by likely relevance to those criteria.

Other notable new features on the site include:

Daily News. The latest product developments and computer news, updated every day by *PC World* online editors Dan Miller, Richard Overton, and Samantha Parent. Look here for news stories that break after the magazine goes to press, as well as updates to stories already published.

Interactive Top 20. A customizable version of *PC World*'s monthly Top 20 PC charts, one of the most popular features in the magazine. Here's how it works: First, you rank price, performance, reliability, and other PC buying criteria according to your priorities. If you like, you can also select a minimum processor speed, a particular brand, and preferences for modem rate, monitor size, CD-ROM drive, and so on. The software then generates a personalized version of the Top 20 chart, with the list of PCs ranked according to the criteria you specified. Try it—you'll be hooked.

Windows 95 Help. A collection of articles from *PC World* and *Multimedia World*, with tips and advice about the new operating system, plus links to other Windows 95 sites.

Windows 95 Tip a Day. A daily e-mail newsletter free to registered members of PC World Online.

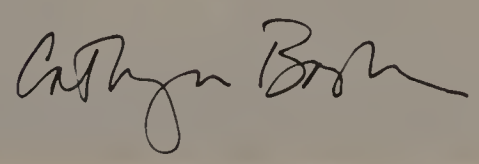
Software Library. A collection of all files mentioned in *PC World*, including utilities, shareware, freeware, drivers, and patches featured each month in our *Bug Watch* column.

Message Boards. Discussion forums for exchanging information, giving and getting advice, and communicating on topics of your choice with *PC World* editors and fellow PC users.

And there's more on the site and in the works, including interactive versions of the *PC World* Top 10 Printers, Monitors, Modems, and Graphics Boards charts; RealAudio columns and features; live chat; special sessions with computer industry experts and editors; and *The Annex*, an interesting new publication that explores the intersection of technology and society. The structure of the new site will also let the online team deliver information that's targeted to your specific needs—in effect, a personal online edition of *PC World*.

For accessing shareware, services, and yes, toothpaste, the quickest route is through PC World Online on the World Wide Web.

So check out PC World Online on the Web, and try the RealAudio tour of the site, which should be available by the time you read this. If you like what you see, subscribe to *PC World Watch*, available free, for biweekly e-mail updates about new features and events at the site. Just fill out the new-user registration form and check *Yes* when asked if you want to be on our mailing list.



Cathryn Baskin, Editor

ERIK BUTLER

AS THE COMPETITION FEVERISHLY TWEAKED AND FINE-TUNED TO GET THEIR MONITORS UP TO OUR STANDARDS, WE QUIETLY WENT AND SET NEW ONES.

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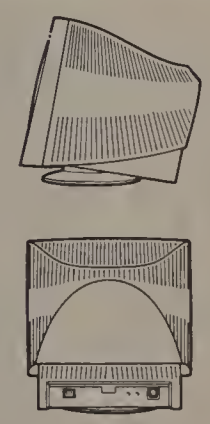

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Circle 205 on reader service card

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Alas, Delrina developers still haven't figured out how to fax into someone's brain after 11 P.M. (when rates are lower) without waking him or her up. Fortunately, their latest release – new Delrina WinFax™ PRO 7.0 – is as easy and powerful as one would expect from the best-selling, most award-winning fax software in the world. It fully exploits new Windows® 95's 32-bit multi-tasking, multi-threading talents for true background faxing, greater speed and more. But it doesn't stop there. With the new TalkWorks™ telephony option and your voice modem, WinFax PRO 7.0 turns your computer into an integrated in-box for faxes, e-mail and voice mail. It even takes phone messages, distinguishes between fax and voice calls, has fax on demand and identifies callers before you pick up. And there's more. Built-in compression cuts fax transmission time (and phone bills) by up to one-third. It now supports gray-scale faxing, integrates with Microsoft® Exchange, and includes OCR, 101 ready-to-use fax cover sheets and tools to design your own. You can even get WinFax PRO as part of new Delrina CommSuite™ 95, the complete, affordable, integrated communications software solution for Windows 95. All of which should suffice until the new alpha wave faxing program is ready. (Hmm. Perhaps if we *partition* your brain so that one half can receive faxes while the other remains undisturbed...)

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Circle 92 on reader service card

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Choosing Your Word Carefully, Paying by the Megabyte

Word 95 Built for Speed

Thank you for "War of the Words: Lotus Word Pro vs. Microsoft Word" [March]. As an avid fan of Ami Pro, I had upgraded to Word Pro 96 and run into a brick wall. I then tried Windows 95 and Word Pro 96 for Windows 95, thinking surely Lotus would have optimized performance. The brick wall was higher and thicker. With Autosave invoked, I got to take a coffee break every 10 minutes. (I have a 486 that serves me very well for 99.9 percent of what I do.)

After reading your review, I made a quick switch to Word 95, and Word Pro is now in the trash. Word may lack a feature or two that I got used to with Ami Pro, but it runs like a charm, and both my stress level and coffee intake are back to normal.

Richard A. Chase, Corona, California

First Amendment Rights and Wrongs

In "Indecent Proposal" [*Breaking News*, March], you say, "While conservative leaders are trying to force an online censorship bill through Congress…." The censorship bill was introduced by the liberal Democrat Sen. James Exon, and as I recall, its most ardent supporter at introduction was the liberal Sen. Dianne Feinstein. The bill's strongest opponents included Newt Gingrich and a host of other conservatives.

While it is true that *after introduction* the Exon Bill picked up support on both sides of the aisle, to portray this as a conservative assault is ridiculous. Just consider that its effect is to increase government control over and intrusion into people's lives—that's certainly not a conservative concept. If you are going to place blame for the creation and adoption of this bill, directly or by innuendo, put it where it belongs.

Richard Megica, Orlando, Florida

Quest for the Best Removable Drive

In "Incredible Expanding Drives" [March], Eric Knorr rates the SyQuest EZ135 drive a Best Buy. His choice is based in part on "cost per megabyte." I question this cost advantage. If you look only at the cost of a single unit of the storage media, SyQuest's product does have an advantage over the Iomega Zip. Once you factor in the higher initial cost of the SyQuest drive, however, you would have to buy many additional disks—about 1.6GB worth—before the cost per megabyte actually beat that of the Zip drive and disks. And if you foresee the need for that much storage, you might as well go for the Iomega Jaz or another such high-capacity product. Consider the other disadvantages mentioned in the article, and I don't see how you can justify rating the SyQuest a Best Buy.

James B. Leuze, Roseville, Michigan

Author's response: If you factor in the cost of the interface from each company, you're right, the SyQuest EZ135 costs more. But you can actually use any SCSI-2 interface with any of these drives, including the EZ135 with the Zip interface, if you like. The article could have made that clearer.

In any event, cost was only part of the equation. The EZ135 received a Best Buy mainly due to its speed. The Zip drive is considerably slower—to the point that I wouldn't attempt running an app from it. I wouldn't hesitate to do so from the EZ135. Running apps isn't necessarily the best use of a removable, but speed is an important factor, even if you just need to off-load your hard disk. The Zip drive's notable strengths are portability, smooth installation, and excellent software. With the EZ135, it's old-fashioned price/performance. —*Eric Knorr*

Scorching Review Revisited

I read with amazement the two-paragraph diatribe by Naomi Wise regarding Betty Crocker's Cookbook CD-ROM [*HouseWare*, February]. Wise is certainly entitled to her opinions, but she should at least get the few facts she purports right.

War of the Words

Lotus Word Pro vs. Microsoft Word

Word Pro 96 is the workgroup king, but slow performance takes it out of play.

By George Campbell

Wise asserts that the "search engine can't find recipes entered by name." In fact, there are two rather obvious ways to find a recipe by name. The first requires two mouse clicks. The main menu, and most screens thereafter, have a control panel with buttons. Pressing the Index button brings up all 1300 recipes, sorted by name. Highlight your selection, and the recipe appears. Alternatively, you can type a name or portion thereof into the Name field on the Custom Search screen. The recipe appears.

Wise also states that in the Cooking With Confidence section, "Recipe directions may start in mid-process…." The statement is simply false. Cooking

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Circle 197 on reader service card

With Confidence is an ancillary section of the CD-ROM (and the book from which it is derived) that is devoted solely to cooking techniques, such as measuring flour or using a springform pan. The section contains no recipes; how could they possibly "start in mid-process"?

Finally, Wise states that the program resizes recipes from 1 to 99 servings. In fact, it resizes from 1 to *999* servings—a minor point perhaps, but further indication of Wise's sloppy research.

Craig S. Barzso, president,
Lifestyle Software Group

Author's response: Barzso is partly correct. I determined that the search engine, not the Index, was unreliable when I attempted to use Custom Search to return by name to several recipes I'd looked at previously. No luck on about half of them. As for resizing to 999 servings, not just 99—I dismissed the third 9 as a misprint, as it seems highly unlikely that somebody cooking from Betty Crocker would be catering for so vast a multitude. In any event, the "automatic" resizing is scarcely useful since its calculation is simply arithmetical, rather than culinary. Anybody can multiply 2 cups times 999, but what's important is how to adjust proportions (for example, liquids to solids), and the cooking time. —*Naomi Wise*

Nothing but the Truth

I ordered *PC World* on a trial basis. Pretty soon I got around to reading it, and I was amazed at the difference between your magazine and the other large computer magazines I subscribe to. It's the honesty.

Most of the others are constantly telling the reader that you can trash your computer if you don't buy this or that to make it faster or more powerful. Then they fill the article so full of jargon that only a seasoned professional could understand it.

Your magazine is written with the reader in mind. I'll even tell you which article did it for me. It was "Best Upgrades for Your 486" by Eric Knorr [November]. It was easy to understand, informative, and exceptionally honest. It is refreshing to read a magazine that tells me I'm wasting my money if I buy something I don't need. Subsequent articles have said as much.

By now you should know that I am impressed enough with your magazine to subscribe. I don't need so many computer magazines—I'll quit a few of the others.

Roy Ratliff, Brownstown, Indiana

Corrections and Clarifications

The number listed for MCI Mail ("The Great E-Mail Shoot-Out," February) is incorrect. The number is 800/444-6245.

The telephone number for Polywell in the February and March Top 20 charts (pages 203 and 119, respectively) was incorrect. The number is 800/999-1278.

A February *Quick Takes* item on Kiplinger's Small Business Attorney misreported the program's capability for handling wills. The shipping version of Small Business Attorney contains six forms for sample wills that were missing in the preproduction software we examined.

The model number of the AMS Power CD8500, the number nine power notebook in our March Top 20 ("Best PCs for Windows 95"), was incorrectly identified. In addition, its standard warranty runs for three years.

The telephone number for Hewlett-Packard in the March Top 20 Power Desktops chart (page 109) was incorrect. The number is 800/752-0900.

"Homeward Bound or Bound for Trouble?" (March) stated that MidWest Micro customers who responded to our Reliability and Service Monitor survey reported the lowest incidence of receiving on-site service. In fact, MidWest Micro did not offer on-site service for its PCs at that time.

Our review of Computer Associates' Simply Accounting 4.0 (*New Software*, March) should have specified that the product is available only as an upgrade to version 3.0, and can be purchased only direct from the company.

PC World regrets the errors.

Letters *welcomes your responses and ideas.* *See page 14 for contact information.*

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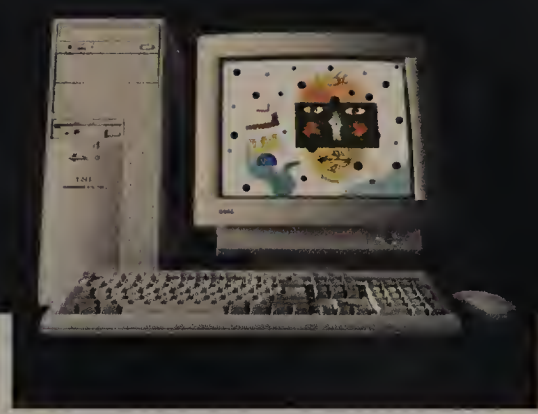

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What Software Should We All Use?

It's the software equivalent of the Tower of Babel: Microsoft Word for Windows running in one department and Ami Pro in another, while a few holdouts somewhere down in Accounting continue to toil on WordPerfect 5.1 for DOS. And the bigger the organization, the thornier the problem—be it sharing files or getting help desk support. The solution is to establish a set of common software standards so that everyone marches to the same drummer. But how do you decide which software to go with? This month Vicki Tinsley, a microcomputer systems supervisor in the Information Systems Department of the city of Manchester, New Hampshire, shows the methods used to standardize an entire city government on a set of off-the-shelf software programs. —*Editor*

So Many Packages, So Little Time

In 1984, the city government's computing environment was much easier to manage. We ran Burroughs B20 8086 microcomputers and used one proprietary word processor, one spreadsheet, and one database. But with the advent of 386 and 486 PCs, local area networks, Windows, and an endless sea of software choices, each of the city's 30 departments began requesting a different set of software, even for the same task. The Police Department alone used three word processors—PFS Write, WordPerfect for DOS, and Ami Pro. By 1995, our city government was running more than 15 different software packages. In my department, there were only two people to support 200 computer users all over the city. There was no way to deliver the training these users needed.

The only way we could relieve this congestion was to develop a set of software standards—a task that sounds simple enough, but one that's actually pretty complicated to implement. If a department switched to a different application, what would it cost us to support it in time, labor, and money? And how many departments would be adversely affected?

So we set up a selection committee composed of a cross section of more advanced computer users from various city departments. We wanted to find out what kinds of applications users ran, and how much time they spent using them. What kind of documents did they produce and what features did they want? To find out, we distributed questionnaires to the departments and collected them at the end of a week.

The survey told us that the majority of users didn't have a great deal of experience with PCs. Most wanted a quick and easy-to-use word processor for basic document editing; some needed more sophisticated publishing features. The few spreadsheet users spent a lot of time creating worksheets, so we knew that getting them to switch would be tough. Most users favored a suite of applications but had no preference as to which one.

And the Survey Says...

Next, we phoned managers of business and government data processing centers to see if their organizations had a standardization policy, how it came about, what standard was selected, and why. Almost all had standardized on Microsoft Office, citing ease of support and training, Microsoft's market share, and the need to share data between departments as their primary reasons.

SETH RESNICK

Vicki Tinsley is a PC systems supervisor for the city of Manchester, New Hampshire.

By that time, we had our objective more clearly in focus. Purchasing separate word processing, spreadsheet, database, graphics, and e-mail programs was prohibitively expensive, so we decided to go with either the Microsoft Office suite or Lotus SmartSuite. (We eliminated Novell PerfectOffice because we'd had problems running WordPerfect 6.0 over our networks.)

After seeing demonstrations of each, most of us agreed that the word processor in each suite—Ami Pro (since renamed Word Pro) and Word for Windows—had comparable features and addressed our users' most common needs. We were impressed by the similarity in look and feel between Excel and 1-2-3 for Windows.

Since document exchange was our users' biggest issue, we began testing to see how easily our existing WordPerfect documents translated into Ami Pro and Word; similarly, we tried importing

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our Lotus 1-2-3 spreadsheets into Excel.

WordPerfect documents were more difficult to transfer into Ami Pro than into Word—outlines and tables lost their formatting. Ami Pro had trouble translating tables even though Lotus provides a filter that slightly improves the translation. 1-2-3 spreadsheets over six pages long hung the computers when imported into Excel, but we had more success when we saved 1-2-3 version 4.0 spreadsheets in 5.0 or 3.1 formats and then converted them to Excel. Even so, some macros and complex formulas still didn't come through.

And the Winner Is...

After reviewing the evidence, the selection committee decided that neither suite was a clear winner. By a narrow vote, we decided that Microsoft Office should be the standard applications set. To avoid a painful transition, our committee decided that 1-2-3 could coexist with the Microsoft suite and get phased out as more users warmed up to Excel.

We still weren't out of the woods, however. When we presented our recommendations to the city's Steering and Advisory committees, users in departments with a major investment in 1-2-3 and Ami Pro disagreed vociferously. Ultimately, everyone came around, but with the stipulation that 1-2-3 would be upgraded and supported in those departments that chose to use it.

In the end, we spent two difficult months working on setting these standards. But we predict that future software installations will proceed more smoothly, and that we'll deliver better support. My department will finally be able to do things that have been put on hold for too long, such as organizing the software library. And with an expanding PC network to support, we feel that taking the time to devise a standardization strategy will save a lot of time, effort, and headache in the long run.

Edited by Bronwyn Fryer

Bronwyn Fryer is a contributing editor for PC World. *If you use PCs to manage people and other resources in a business environment, we want to hear from you—we pay $300 for published columns. See page 14 for contact information.*

PC Talk

With Kate & Jack

On The Road

PC Talk

With Kate & Jack

Kate: Good morning and mega power from South Dakota! This is "PC Talk with Kate and Jack — On the Road" broadcasting live from Gateway 2000® headquarters in North Sioux City, South Dakota.

Jack: When we heard Gateway had developed a whole new computer category for the entire family, we decided to jump in the PCQA mobile and check it out for ourselves. All this fresh Midwestern air has us perkier than a double espresso. Aren't you glad I scored that invite from Ted?

Kate: Yeah, yeah, whatever. You see, Jack is convinced that he's the reason we're here. Because after Gateway 2000 Chairman and CEO Ted Waitt called our show one day, Jack kept him on the line — schmoozing and hinting around that we wanted to come up and see Gateway. We were flabbergasted when we got an e-mail later that day with Ted's personal invitation for us to visit.

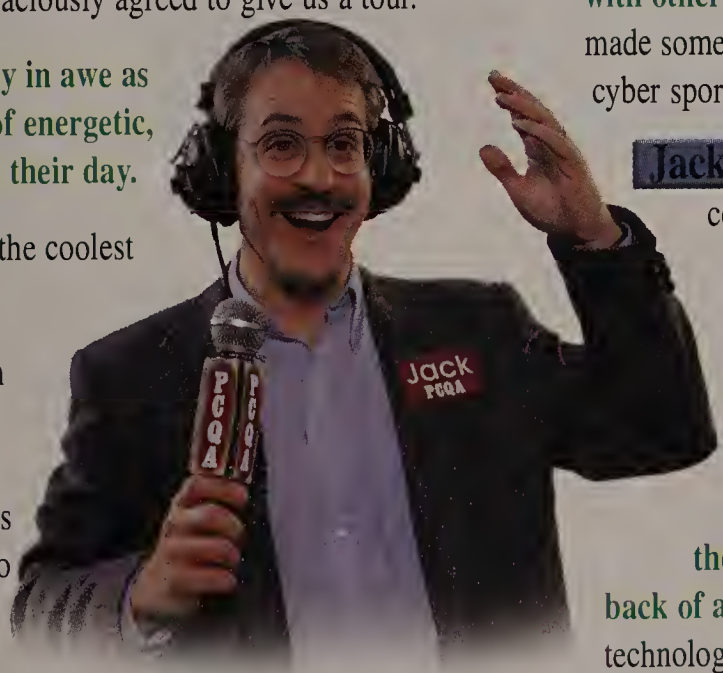
Jack: And man, are we impressed! When we pulled up to Gateway's cow-spotted mega building bright and early this morning, even Kate was speechless. We were basking in the golden glow of the South Dakota sunrise when we were greeted by a friendly woman named Jessica. She's a sales rep who came in early to get a jump on her paperwork, but she graciously agreed to give us a tour.

Destination® Big Screen PC features a fast Pentium® processor, cable-ready TV tuner, Destination31 monitor (31" viewable), wireless keyboard & Field Mouse™ remote, & Destination Software Collection starting at $3,499.

Kate: We were literally in awe as we watched thousands of energetic, excited employees begin their day.

Jack: Tell them about the coolest thing we saw!

Kate: Be patient — I'm getting to it. Amidst the hustle and bustle, we couldn't help but hear this incredible booming stereo sound. It sounded like a movie theater, and it was coming from a dark secluded area. Jessica let us check it out, and lo and behold, there was one of those honkin' Destination31 monitors (31-inch viewable) — just like the one delivered to the station the day we talked to Ted.



Jack: Yeah, but this was more than just the monitor, it was the whole Destination Big Screen PC including the fabulous wireless keyboard and Field Mouse™ remote! The Gateway crew had put it in an entertainment center and built a family room setting in their test lab. When we got there, at least a dozen people were lounging on the sofa and playing the sports car game *The Need For Speed*.™

Kate: Jeff from Jersey City is dying to get through on the phone. Fire away, Jeff!

Jeff: *You've seen the Destination Big Screen PC? I've been wild to get one for my family ever since I heard Gateway was coming out with it.*

Kate: Now's your chance, Jeff. The Destination Big Screen PC has blown the PC market open with a totally new category of computer. Gateway's Destination Big Screen PC is the result of the convergence of the PC and the TV — it will revolutionize computer use in the home. The Destination system is designed for the family room, and it is perfect for anyone who wants to share their computing experience with others — even if it's just one other person. And it really made some cool sounds when Jack crashed into the wall with his cyber sports car!

Jack: I had just got 'er over 160 mph when a computer-controlled car in back of me took me out. The end-over-end rumble was intense. Mary from Miami, you're on!

Mary: *What's the deal with the "wireless devices?"*

Kate: They function exactly like your standard keyboard and mouse but without the wires. That means you can use them while lounging on the couch, walking around the room or standing in back of a group of people. Because they use radio frequency technology, these wireless devices have more range than an all-star shortstop.

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Mary: *Sounds like they are just as convenient as my TV remote.*

Jack: Even more so, Mary. **With the wireless keyboard and Field Mouse remote, you don't have to point them at the monitor like you do with a traditional remote.** Why I could even point and click through my Uncle Jake's big head!

Kate: The keyboard and mouse have all the buttons you need to control every function of your Destination® Big Screen PC. On top of that, the mouse has a button for novices and young children so they can automatically go back to the TV. And we can't forget the Destination Big Screen PC's television capabilities.

Jack: That's right. **Anything you can do with a TV, you can do with a Destination system — run cable TV to it, connect your satellite dish or VCR, even your laser disc system or game machine.** Plus the Destination Big Screen PC is designed to work specifically with your stereo system, so you'll experience the quality sound you're accustomed to receiving from your stereo.

Mary: *Can the Destination system still function as a basic computer system?*

Kate: Absolutely. **It has all the horses of a high-performance Pentium® processor with plenty of RAM and a huge hard drive. Plus it's all chained to a fast CD-ROM drive.** Happy computing!

Jack: Tom from Tampa, you're on the air!

Tom: *Mega power, Jack. I had planned to purchase a Gateway P5-166XL multimedia system in a couple of weeks. But now I'm considering the Destination Big Screen PC. What options do I have?*

Jack: **Gateway had its valued customers, like you, in mind while they were designing this new product, so they came up with the Destination Big Screen PC package. It's very simple to convert a Gateway Multimedia system into a Destination Big Screen PC.**

Tom: *What comes with the Destination Big Screen PC package?*

Jack: You get the Destination31 monitor (31-inch viewable), Destination 2MB VRAM graphics accelerator with cable-ready TV tuner, hi-fi wavetable audio card, four-channel wireless keyboard with integrated EZ Pad™ pointing device and wireless Field Mouse™ remote, and the Destination Software Collection.

Kate: Your sales rep can fill you in on the rest of the details. Thanks for the call, Tom!

Jack: We got the scoop on this hot new product, plus a ton of other stuff, when we were in the sales area this morning. The action was so intense, it sounded like the pit at the stock exchange. **Hundreds of sales reps were on the phone helping customers custom-configure systems for their individual needs.** If someone wanted a bigger hard drive on their system, bingo. The change was made, and the order was shot off to manufacturing. Hey, Mike from Memphis wants to talk about the burly power of Gateway's G6 machines.

Mike: *Sounds like Gateway is moving into the family room big time with its Destination Big Screen PC. But don't forget their workstations.* ***That Gateway G6-150 is one of the best workstation values in the industry*** *— I just ordered another one for my accounting business today.*

Jack: Wow! Tell us more!

Mike: *I need an ultra-high performance PC with Microsoft® Windows® NT™ 3.51 to squeeze every speck of performance out of 32-bit software applications like those in MS Office 95, Professional Edition.* ***The G6-150 was the perfect solution for my intensive computing needs — the price was the clincher at only $3,199.***

Kate: Amazing. Gateway has come out with a ton of cool stuff on their Solo portable PCs like the modular 4X CD-ROM drive, the EZ Pad™ pointing device and now this humongous new screen. What will they come up with next? Bert from Boston, you're on!

Jack: Yow, that's an intense value, Mike! I bet the accounting crew at the station is drooling at the thought of a 32-bit screamer for such an amazing price. And don't Gateway customers now have a choice of MS Windows NT 3.51 or Windows 95 on their G6 systems?

Mike: *That's right. And MS Windows NT 3.51 is available as an upgrade for only $99 on all desktop Pentium processor-based PCs, and Windows for Workgroups 3.11 is also available on Gateway's Intel® Pentium processor-based desktop and portable systems.*

Jack: You're a walking Gateway encyclopedia, Mike. You better watch out — they might recruit you for an ad. Thanks for the call!

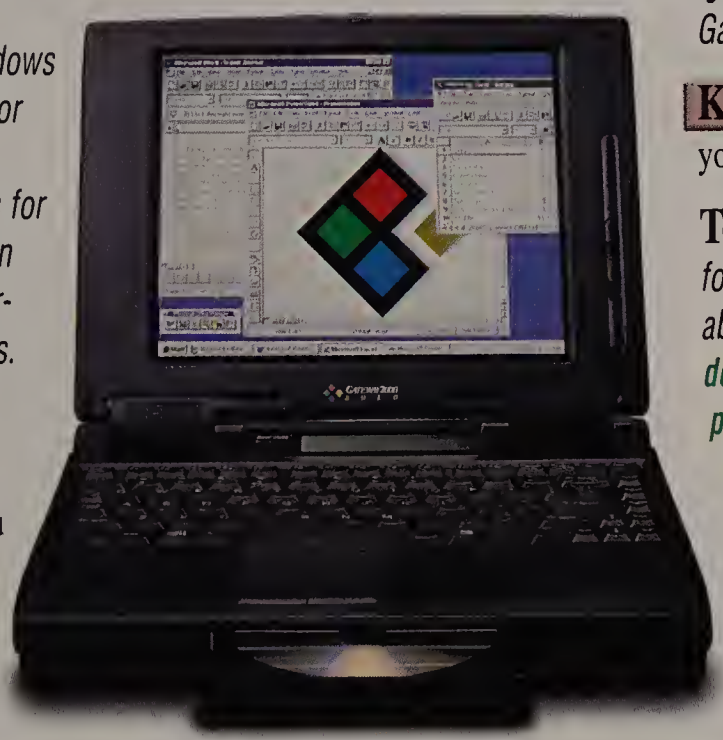
Kate: Jack! Do you see the guy in that office over there?

Jack: What about him? He's using a Gateway Solo™ portable PC.

Kate: Yeah, but look at that screen. The colors are vibrant, and the screen image looks extra big. Let's check it out.

Kate: Hi, we're from PCQA radio, and we couldn't help but notice the screen on your Gateway Solo portable PC.

Greg: *Nice to meet you. I'm Greg from engineering. We've upped the ante in high-quality portable PCs by offering an even bigger screen.* ***All Gateway Solo portable PCs are now available with 11.3-inch active matrix SVGA color screens — a 17% increase in viewable screen area compared to the 10.4-inch screen.***



The Gateway Solo™ S5-120XL Best Buy portable PC features an 11.3" SVGA color display, 40MB RAM, 1.2GB hard drive, modular 4X CD-ROM drive, 28.8 PCMCIA fax/modem,16-bit sound, speakers & MS Office 95 for $5,599.

Bert: *Hi Kate! I'm really excited about the larger screen size on the Gateway Solo portable PC. I'm an archeologist, and I've been looking for a portable PC I can use on my expeditions. A bigger screen will help me read my maps and diagrams while I'm out in the field. I think I'll give Gateway a call right now and order a Gateway Solo PC.*

Kate: Good choice, Bert. Tory from Tulsa, you're on!

Tory: *I've had my Gateway Solo S5-75XL PC for just a couple of weeks, but I'm already nuts about it.* ***It has all the capabilities of a desktop PC in a portable package — a powerful Pentium processor, 8MB RAM, 256K pipelined burst cache, plus 16-bit sound and speakers.*** *And like all Gateway Solo portable PCs, it has a modular 4X CD-ROM drive that whips through multimedia apps in no time, and when I want to kick back, I can just drop in my favorite CD. All that for only $2,899.*

Kate: That's a hot price for a multimedia portable PC. And that 4X CD-ROM drive is a screamer — it's one of the fastest CD-ROM drives available in a portable PC. Thanks for the call, Tory!

Greg: *Hey, it was great to meet you, but I have to get to a meeting. If you guys want to see even more action, go over to manufacturing. That place is always hopping.*

Jack: Sounds good. We're heading down there right now!

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PC Talk

With Kate & Jack

Kate: Greg was right — manufacturing is really rockin.' As speak, I'm holding the packing slip in my hand for a PC ordere by Kay from Kansas City. She's getting a P5-166XL multimed system complete with an 8X EIDE CD-ROM drive and a 2.5GB EIDE hard drive. I didn't think this stuff was even on the market yet.

Jack: **Gateway just stormed the market with a whole slew of innovative new products, in addition to the Destination® Big Screen PC. And they're offering them at an incredible value to customers out there like Kay.**

Kate: Let's get a word with Stan, one of the assembly technicians putting the final touches on Kay's mean multimedia machine. So Stan, what's it like to work for the nation's leading direct marketer of PCs?

Stan: *I absolutely love it! It's great to be part of a company th cares about both its customers and its employees. Gateway 200 has an unbelievable team spirit.* ***We have a good time, but we know that our first priority is to send only quality, high-performance PCs out the door every day.*** *We're really into quality assurance — in fact, our manufacturing facility here in North Sic City is ISO 9002 certified.*

Kate: Keep up the great work, Stan. Hey, speaking of Kansa City, Kevin from KC is on the phone. You're on the air, Kevin!

Kevin: *Mega power, Kate! I listen to your show all the time. I'm a freelance writer, and I'm thinking about getting a Gateway I I could really use it to do research with applications like Microso Encarta® and MS Bookshelf.® And I hear that new 8X EIDE CD-ROM has a data transfer rate of 1200Kb/second — twice as fast the 4X CD-ROM drive.*

Jack: **You'll always get the latest technology from Gatewa 2000 — stuff so new that it won't be obsolete in a few month**

Kevin: *So they just build whatever I want right there at North Sioux City?*

Kate: You bet, Kevin. We've seen it with our own eyes.

Kevin: *Radical! I know some people w work at the Gateway facility here in Kansas City. They sound just like that guy Stan — always talking about the great team spirit.*

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GATEWAY2000 SOLO™

S5-75XL

- 10.4" SVGA Color Display
- 75MHz Intel® Pentium® Processor
- 8MB RAM (expandable to 40MB)
- 256K L2 Pipelined Burst Cache
- 540MB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- EZ Pad™ Pointing Device
- 86-Key MS Windows® 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2® Ports
- Built-In Mic, Headphone and Line-In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Works 95
- Carrying Case

$2899

S5-120XL

- 10.4" SVGA Color Display
- 120MHz Intel Pentium Processor
- 16MB RAM (expandable to 40MB)
- 256K L2 Pipelined Burst Cache
- 810MB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- EZ Pad Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2 Ports
- Built-In Mic, Headphone and Line-In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Office 95, Professional Edition*
- Carrying Case

$3799

S5-90XL

- **11.3" SVGA Color Display**
- 90MHz Intel Pentium Processor
- 16MB RAM (expandable to 40MB)
- 256K L2 Pipelined Burst Cache
- 810MB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- EZ Pad Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2 Ports
- Built-In Mic, Headphone and Line-In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Office 95, Professional Edition*
- Carrying Case

$4099

S5-120XL BEST BUY

- **11.3" SVGA Color Display**
- 120MHz Intel Pentium Processor
- 40MB RAM
- 256K L2 Pipelined Burst Cache
- 1.2GB Hard Drive
- Modular 4X CD-ROM Drive
- Modular 3.5" Floppy Drive
- Integrated 16-Bit Sound with Stereo Speakers
- 1MB Video RAM
- Lithium Ion Battery & AC Pack
- 28.8 PCMCIA Fax/Modem
- EZ Pad Pointing Device
- 86-Key MS Windows 95 Keyboard
- Parallel, Serial, Infrared, VGA & PS/2 Ports
- Built-In Mic, Headphone and Line-In Jacks and External Volume Control Dial
- 11.8" x 8.8" x 2.0"
- Microsoft Windows 95
- MS Office 95, Professional Edition*
- Carrying Case

$5599

OPTIONS

- PCMCIA 28.8 Fax/Modem **$229**
- PCMCIA 14.4 XJACK® Fax/Modem **$119**
- Solo Docking Bar **$150**
- 3-Year Limited Warranty **$100**
  (For a free copy, call or write.)

The Gateway Solo line starts at 5.4 lbs. Weight includes 8MB RAM, 810MB hard drive, Lithium Ion battery & option bay cover.

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Portable Sales

Kate: Greg was right — manufacturing is really rockin'. As we speak, I'm holding the packing slip in my hand for a PC ordered by Kay from Kansas City. She's getting a P5-166XL multimedia system complete with an 8X EIDE CD-ROM drive and a 2.5GB EIDE hard drive. I didn't think this stuff was even on the market yet.

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Kevin: *Radical! I know some people who work at the Gateway facility here in Kansas City. They sound just like that guy Stan — always talking about the great team spirit.*

Jack: **You can't beat Gateway's great computers, built and supported by dedicated employees — you'd better give them a call today, and get your own Gateway PC!**

Kate: Speaking of mega power, look who's over there by the assembly line! It's Ted Waitt.

Jack: No way. Ted's hanging out in manufacturing? I love it.

Kate: Ted! It's us — Kate and Jack from PCQA's "PC Talk."

Ted: *Sure, I talked to you guys the other day on the phone. You sure didn't waste any time heading out here.*

Jack: This is where all the hot news in the PC industry is, Ted. You'll never have to ask us twice to come visit.

Ted: *Hey, you're always welcome. You guys probably help us sell a lot of PCs.*

The P5-166XL mulitimedia PC features 16MB EDO DRAM, 2.5GB hard drive, 16-bit sound, speakers w/ subwoofer & TelePath® 28.8 fax/modem for $3,599.

Jack: So Ted, I noticed that your office is just right upstairs, do you get down to manufacturing often?

Ted: *It's my roots, Jack. I started out in manufacturing — along with sales and technical support, plus I've done a little engineering, a little advertising, a little shipping — you name it — I've done it. We all work as a team here to provide our customers with the latest technology at a great price.*

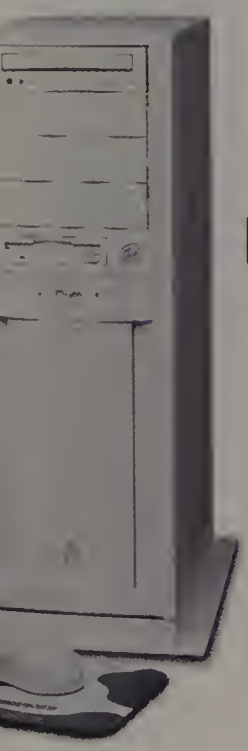
Kate: You know, before we came here we knew you guys had the best PCs at the best values in the industry, and that you were a little funky — what with the cow spots and all. But after seeing the phenomenal energy of the Gateway team, now I know how you do it.

Ted: *You hit the nail on the head, Kate. It's the people at Gateway that set us apart from other PC companies. They take pride in what they do, and have a lot of great ideas on how we can make our products even better. That's part of the reason I like to hang out down here whenever I can. We're all dedicated to making sure every PC that goes out the door is a quality machine. Every Gateway employee worldwide takes this responsibility very seriously.*

Jack: *Whoa!* That's quite a concept. It's not hard to figure out why Gateway 2000 is the best.

Ted: *I hope you guys have had a good time here today. Stay as long as you like, but you might want to check out the PCQA mobile.*

Kate: Why's that, Ted?



Ted: *Well, the folks out there painting cow spots on the building seem to have gotten a little carried away. Your PCQA mobile is now cow spotted. Hope you like black and white!*

Jack: Cool! Now we're really part of the Gateway family. C'mon, Kate — let's cruise!

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Multimedia Systems

P5-100 FAMILY PC™

- Intel® 100MHz Pentium® Processor
- 8MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec™ Lansing ACS-40 Speakers
- TelePath® 28.8 Fax/Modem
- CrystalScan®15 .28dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- Microsoft® Windows® 95
- Generations II Software Collection

$1899

P5-120 FAMILY PC

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 6X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem
- Vivitron™15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection

$2349

P5-133 FAMILY PC

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 2.5GB 10ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator with MPEG Video Scaler
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Gateway Sound Card
- Altec Lansing ACS-40 Speakers
- TelePath 28.8 Fax/Modem
- CrystalScan17 .28dp Monitor (15.7" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- Generations II Software Collection

$2799

P5-166XL

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 512K Pipelined Burst Cache
- 2.5GB 10ms EIDE Hard Drive
- Matrox® 2MB WRAM Graphics Accelerator w/ MPEG Video Scaler
- 8X CD-ROM Drive/3.5" Diskette Drive
- 16-Bit Ensoniq® Wavetable Sound Card
- Altec Lansing ACS-400 Speakers w/ ACS-250 Subwoofer
- TelePath 28.8 Fax/Modem
- Vivitron17 .26dp Monitor (15.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*
- Generations II Software Collection

$3599

Destination® Big Screen PCs

D5-100

- Same as P5-100 Family PC System w/ Destination Big Screen PC package replacing corresponding standard components and software

$3499 *(details on next page)*

D5-120

- Same as P5-120 Family PC System w/ Destination Big Screen PC package replacing corresponding standard components and software

$3799 *(details on next page)*

D5-133

- Same as P5-133 Family PC System w/ Destination Big Screen PC package replacing corresponding standard components and software

$4199 *(details on next page)*

D5-166

- Same as P5-166XL Multimedia System w/ Destination Big Screen PC package replacing corresponding standard components and software

$4699 *(details on next page)*

Professional Systems

P5-75

- Intel 75MHz Pentium Processor
- 16MB EDO Performance DRAM
- 850MB 10ms EIDE Hard Drive
- 1MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X CD-ROM Drive/3.5" Diskette Drive
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

$1799

P5-120

- Intel 120MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 1.62GB 9ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 6X CD-ROM Drive/3.5" Diskette Drive
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

$2099

P5-133

- Intel 133MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 2.5GB 10ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

$2349

P5-166

- Intel 166MHz Pentium Processor
- 16MB EDO Performance DRAM
- 256K Pipelined Burst Cache
- 2.5GB 10ms EIDE Hard Drive
- 2MB DRAM, 64-Bit PCI Graphics Accelerator
- 8X CD-ROM Drive/3.5" Diskette Drive
- Vivitron15 .26dp Monitor (13.9" viewable)
- 7-Bay Mini Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows 95
- MS Office 95, Professional Edition*

$2699

Workstations

G6-150

- Intel 150MHz Pentium Pro Processor
- 16MB DRAM
- 256K Internal Cache
- 2.5GB 10ms EIDE hard drive
- Matrox 2MB WRAM Graphics Accelerator w/ Video Scaler
- 8X CD-ROM Drive/3.5" Diskette Drive
- Vivitron15 .26dp Monitor (13.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows NT™ Workstation 3.51 or MS Windows 95
- MS Office 95, Professional Edition*

$3199

G6-200

- Intel 200MHz Pentium Pro Processor
- 64MB DRAM
- 256K Internal Cache
- 2GB Fast SCSI 9ms Hard Drive
- Matrox 4MB WRAM Graphics Accelerator w/ Video Scaler
- 4X SCSI CD-ROM Drive
- 3.5" Diskette Drive
- Vivitron21 Monitor (19.9" viewable)
- 12-Bay Tower Case
- 104+ Keyboard & MS Mouse 2.0
- MS Windows NT Workstation 3.51 or MS Windows 95
- MS Office 95, Professional Edition*

$6499

** MS Office 95, Professional Edition includes Word, Excel, PowerPoint® presentation graphics program, Schedule+, Access database and Bookshelf® '95.*

All systems standard with Gateway Gold™ Service & Support

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REGISTERED COMPANY ISO 9002 SGS

GSA Schedule # GS-00K-94-AGS-5150-PS01

Generations II SOFTWARE COLLECTION

- Microsoft Encarta® 96 ■ MS Cinemania® '96 ■ MS Julia Child: Home Cooking with Master Chefs ■ MS Bob,™ For Gateway 2000 ■ MS Works 95 ■ MS Publisher 95 ■ MS Money 4.0 ■ MS Golf 2.0 ■ MS Music Central™ 96 ■ MS CD Sampler ■ MS Entertainment Packs 1-4 (31 fun games!) ■ Ca$h Graf Home Office Plus™ ■ Mayo Clinic® Family Health Book ■ Mediamatics Arcade™ MPEG Player ■ The Masters®: Interactive Journey Through Its 60-Year History, for MPEG

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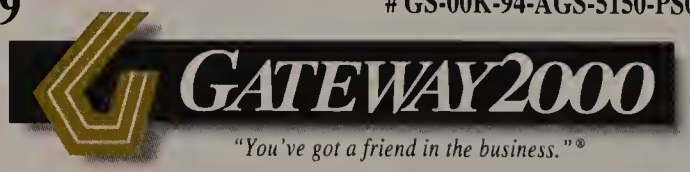

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PC WORLD BEST BUY

WINDOWS MAGAZINE 1994 RECOMMENDED

PCI LOCAL BUS

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Circle 107 on reader service card

Desktop Movies: Build Your Own Blockbusters

"Poor Manes," my editors keep clucking behind my back. "The dope has fallen in love with a program designed to help kids create *cartoons!*"

True. Guilty as charged. But where they see kids and cartoons, I see would-be Shakespeares and personal Globe Theatres. Where they see mindless entertainment, I see a software tool, the kind of great equalizer the best programs always are. Think of the software genres that made the PC industry what it is: spreadsheet, word processor, desktop publisher, presentation package. What these applications have in common is that they make it possible for mere mortals to produce results—documents, financial scenarios, slides—previously achievable almost exclusively by professionals.

And that's just what a program called Hollywood (Theatrix Interactive, about $40, 800/955-8749) does for animated cartoons. Yes, it uses funny animal characters with computer-generated voices. Yes, it's intentionally pitched at kids. And yes, it bears the same name as an unlamented, long-discontinued presentation package from IBM. But playing with it for half an hour ought to convince almost anyone that this just might be the foam on a heretofore unseen wave of the future.

By now the editors no doubt think I am foaming at the mouth. But I hold steadfast to my claim: Hollywood is something new, different, and important, nothing less than a what-if tool for audiovisual communications.

Try the program and judge for yourself. First you pick a setting and characters. They appear in a window in the top half of the screen. You can drag an actor around with the mouse, and with a click or three you can change its expression, action, direction, or tone of voice. The stage directions appear on the bottom half of the screen in a "drama processor" that also lets you type in any dialogue you'd like the characters to say.

Now comes the magic. Click Play, and the characters not only enact the gestures you gave them, but speak your dialogue in the computer-synthesized voices you chose. All of a sudden you can hear and see how dialogue and action work on the screen instead of just in your mind's eye.

Consider this: There is virtually no limit on what you can have the characters say. Write your speech for next week's presentation in your word processor, and you can copy it to the Windows clipboard and paste it into Hollywood. Now, a cartoon character in a palm-frond hat reads it at least as expressively as you would. Suddenly you realize that your jokes don't work, your explanations would put caffeine addicts to sleep, and your speech runs about three times as long as it ought to.

Palm Man Lays Egg

The Palm Man has laid an egg so you don't have to. You set about punching up the laugh lines and cutting out the deadwood. The next time Palm Man reads it, the speech seems a whole lot snappier. So is this just for kids? The interface is amazingly easy to get the hang of, and once you fool around with Hollywood, you'll probably come up with all sorts of ideas even the program's creators never imagined.

The abstraction of using cartoon characters—rather than pseudorealistic humans that fool no one—makes it easier to have them stand in for anyone you wish, from janitors to software moguls. Though you have only ten characters to choose from, just giving one a friend's name (or an enemy's) and a halfway fitting voice helps make your production resonate with recognition and meaning. Is your boss an aardvark, an alligator, or a pig? I bet you know already.

I'm not mad, I tell you! People are going to use programs like this to create drama and comedy in all sorts of creative ways that were simply impossible when it required rounding up actors and stagehands and key grips. Run-time versions will let you send your productions to dazzle poor souls who don't own the program. Character customization and presentation interface modules will let your on-screen persona (or Cindy Crawford's) narrate your PowerPoint slides. Someday you may even buy Star Packs featuring Glenn Close, Tom Cruise, or Big Bird. And in the not-too-distant future, when some animation software production wins an Oscar, I will magnanimously greet my editors with "Nyah, nyah. Told you so."

Cartoon characters can easily stand in for anyone you wish. Is your boss an aardvark, an alligator, or a pig? I bet you know already.

Hey, in Hollywood, stranger things have happened.

PC World *contributing editor Stephen Manes is a columnist for the* New York Times *and coauthor of* Gates: How Microsoft's Mogul Reinvented an Industry *(Touchstone/Simon & Schuster, 1994, 800/223-2348).*

By Stephen Manes

ERIK BUTLER

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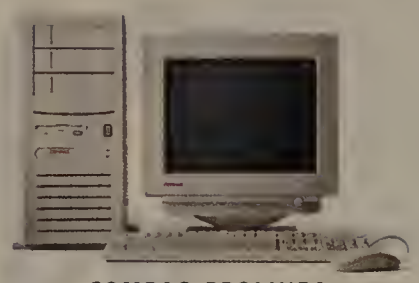

COMPAQ PROLINEA

	575e	5100e	5133	5166
Processor	75MHz Pentium®	100MHz Pentium	133MHz Pentium	166MHz Pentium
Std./Max. Memory	8MB/136MB	8MB/136MB	16MB/192MB	16MB/192MB
Hard Drive	630MB or 1GB	630MB or 1GB	2GB	2GB (ML)
Cache Internal	16KB	16KB	16KB	16KB
Cache External	256KB (optional)	256KB (optional)	256KB	256KB
Architecture	PCI	PCI	PCI	PCI
Video Memory/Max.	1MB/2MB	1MB/2MB	1MB/2MB	2MB/8MB (ML)
Compaq 150 Color Monitor	Yes (13.8" viewable)	Yes (13.8" viewable)	Yes (13.8" viewable)	Yes (13.8" viewable)
Diskette Drive	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB	3.5" 1.44MB
Expansion Slots (Total)	3	3	5	5
Drive Bays (Total)	3	3	5	5
Ports: Serial/Parallel	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)	1/1 (ECP)
Security Features	Yes	Yes	Yes	Yes
Processor Upgradable	Yes	Yes	Yes	Yes
101-Key Keyboard, Mouse	Yes	Yes	Yes	Yes
Software Preinstalled (Choice of)	Windows® 95 or Windows 3.1	Windows 95 or Windows 3.1	Windows 95 or Windows 3.1	Windows 95 or Windows 3.1
Energy Star Compliant	Yes	Yes	Yes	Yes
Limited Warranty†	3-Year	3-Year	3-Year	3-Year
Price*				
630MB Hard Drive	**$1,739**	**$1,849**	-	-
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CONNECTING AT

The quick cure for sluggish Internet surfing and remote access is an ISDN modem. Prices have fallen and service is easier to obtain. But pitfalls remain.

It's the end of the line for your modem. With the limits of analog phone technology, you won't see speeds much faster than today's 28.8 kilobits per second—aside from one last push by some vendors up to 33.6 kbps. If you want zippier performance from online services, the Internet, or remote LAN access, your only real option now is a 128-kbps digital modem.

"Digital modem" is a sly way of saying ISDN. You know—the Integrated Services Digital Network that's notorious for being hard to get and impossible to install. ISDN is suddenly hot because the explosion of Internet surfing and remote computing is driving up demand for faster data communications. Prices for digital modems have fallen, and when you call your local phone company to order service, it's now much less likely to ask "ISD-what?" Even Microsoft is getting into the act, with a marketing effort to promote the use of ISDN with Windows 95 and the Internet.

To check on ISDN's viability, we examined new products from 3Com, IBM, and U.S. Robotics that start at about $500 and can be installed by a PC user—albeit one not afraid of challenges. Our experiences were largely more positive than in the past.

Though ISDN faces competition from other technologies, it offers one big advantage: The hardware and service are available now. Rivals, including cable modems and an alternative phone-line technology called ADSL, will not become widely available for two years (see "Cable Links, Faster Phones—Someday").

HIGH-SPEED DATA ACCESS goes portable with IBM's WaveRunner.

Realistic Expectations

We took four digital modems for a spin on the Internet—and they flew! In informal tests under Windows 3.1, the devices downloaded a 359K file from a Web site in as little as 32 seconds, about one-quarter the time of a 28.8-kbps analog modem. They also loaded Web pages noticeably faster. But *caveat surfer:* Web connections are only as fast as their slowest link. Connect to a Web site with a slow server or a

Edited by Andy Reinhardt and Randy Ross

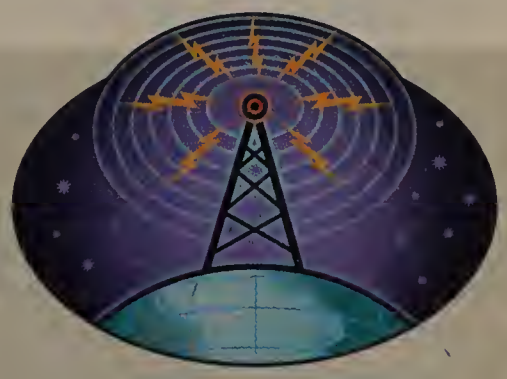
QUAD SPEED

slow modem, and your digital rig could offer all the zip of a 14.4-kbps modem.

Installation can be tricky, but it's manageable. The process consists of four steps: Ordering an ISDN line from the local phone company (a pain), connecting the modem to your PC (simple), configuring the modem with its own software (difficulty depends on modem), and configuring your software to recognize the modem (agony depends on application).

First, you call the phone company and request a service called ISDN *basic rate interface*, or BRI, which provides two 64-kbps channels that can behave as a single 128-kbps data pipe. Though BRI doesn't require any special wiring, the phone company must configure switching equipment to support your hardware. This is more difficult than it sounds: We had to badger Nynex every day for a week before a line installed in our Boston office ran properly. Once your line is properly configured, expect to spend a few hours installing the modem and consulting tech support.

We recommend using digital modems for tapping into online and Internet services. Implementing high-speed remote access is more complex: Your network administrator will need to add ISDN hardware to the LAN, which can cost $5000 to $10,000 and must be compatible with your



Breaking News

INTEL MULTIMEDIA: A new technology from Intel adds more support for video, audio, graphics, and communications functions to the CPU. Systems with the MMX technology will rely less on third-party video and audio boards and more on the CPU, which means you'll get more PC for your peso. You may also see improved performance. Microsoft's on board, but Intel needs to convince other software and hardware vendors to adopt MMX, which should appear in Pentiums by the end of 1996, the company says. —R. O.

120MB FLOPPY: A new kind of floppy drive from Panasonic and 3M uses disks that hold about 80 times more data than today's 1.44MB disks. The drive can also read from and write to 1.44MB floppies. It'll add at least $200 to the price of a PC, so it's not going to show up in entry-level systems, says Phil Devin, a Dataquest analyst. Compaq says some of its new DeskPros, shipping in April, will be the first to market with 120MB drives. Expect the drives in other vendors' higher-end PCs by June, Devin says. Third parties will probably start to sell add-on kits this summer. The disks should retail for about $20 each. —L. M.

AT&T ROCKS NET ACCESS: WorldNet, AT&T's new Internet service, is expected to include radical pricing schemes and unique services. For starters, AT&T will offer its 80 million residen-

(continued on page 51)

OPENING ILLUSTRATION: JEFF BERLIN; ILLUSTRATION, UPPER RIGHT: JEFFREY PELO; PHOTO: GIAMPIERO BENVENUTI

digital modem. However, ISDN modems understand AT commands, the lingua franca of comm software, so they should work with—and significantly improve the performance of—communications applications, such as terminal emulation, remote control, and white-boarding programs.

In general, off-the-shelf digital modems do not support videoconferencing. Even though many videoconferencing products run over ISDN, they typically employ proprietary hardware that can't also be used for Internet and remote access applications.

Latest Digital Modems

The newest digital modems are simpler to use than earlier-generation ISDN terminal adapters, which require a special device called an NT-1 to connect to the ISDN phone network. The two external products previewed here both have the NT-1 built in. Many ISDN modems also include ports for attaching analog modems, fax machines, or phones. This is ideal for small or home offices because you can use one 64-kbps channel for data and the other for phone and fax, instead of obtaining two or more separate phone lines, an inconvenient and often costlier option. Each channel can even have its own phone number.

Of the devices we examined, the 3Com Impact ISDN External Digital Modem was the easiest to install and use. To set it up, you enter on a single screen four ISDN configuration settings provided by the phone company. Click the Configure icon, and the Impact tests your ISDN line. Another nicety: Once the modem is configured, you shouldn't need to revisit the setup screen. Some other products require you to load different protocols when you change applications.

SERVICE TO THE SUBURBS: Analyst Sanjay Mewada expects ISDN to become widely available this year, except in rural areas.

The $449 Impact determines the correct protocol for you and invokes it automatically. (Many PC apps and CompuServe require V.120; Internet access requires PPP, which now tops out at 64 kbps; and the new Multilink PPP supports a full 128 kbps.) A $749 model includes a built-in 14.4 analog fax-modem that lets you connect to non-ISDN users.

U.S. Robotics' external Courier I-modem was also easy to set up. The manual is the simplest we saw, and as with the 3Com Impact, configuration occurs on a single screen. The $895 product also emulates a 33.6-kbps modem, which means it would be a good choice for anyone who wants to both upgrade their modem and add ISDN capabilities in one shot. Currently the I-modem doesn't support the Multilink PPP protocol, so Internet performance is limited to 64-kbps speeds. (The vendor expects to offer a downloadable software upgrade for Multilink PPP in April.)

The only internal card we looked at, the IBM WaveRunner Digital Modem ISA Adapter, offers various trade-offs. On the upside, internal devices tend to be less expensive than external units. They also can be faster, although we didn't observe this in our informal tests. (External devices are limited by serial port speed, which typical-

No ISDN in Your Area? Try a Satellite Link

The author, with his dish

If your local phone company doesn't offer ISDN—or if you're looking for an even faster Internet connection—DirecPC is one option. Priced at $1149 including installation, Hughes Network Systems' DirecPC consists of a 24-inch satellite dish, an ISA bus board for the PC, and Windows software.

Since it lets you download files and Web pages at speeds of up to 400 kbps, DirecPC makes an ISDN modem seem downright poky by comparison. But that ultrafast pipeline from the Net won't help you when a Web site is jammed.

Since the DirecPC satellite dish can receive—but not send—data, you still need a modem and a phone line to dispatch commands, files, and other bits of data to your Internet service provider and out to the Net. So if you're interested in videoconferencing or other two-way, data-intensive applications, DirecPC isn't the answer.

There are other considerations as well. Installation is complicated and requires a trained technician. (It took a Hughes professional 5 hours to install the dish and set up my PC.) And the pricing plan is based on the amount of data downloaded, not on the number of hours spent online, so you pay either $15.95 a month for 30MB of "activity" (downloaded data) or $39.95 a month for 130MB—fairly pricey either way. Both options provide added services, such as CNN Headline News (sent via the Hughes satellite to your PC) and a stock ticker service from Data Broadcasting Corporation. —Jeff Bertolucci

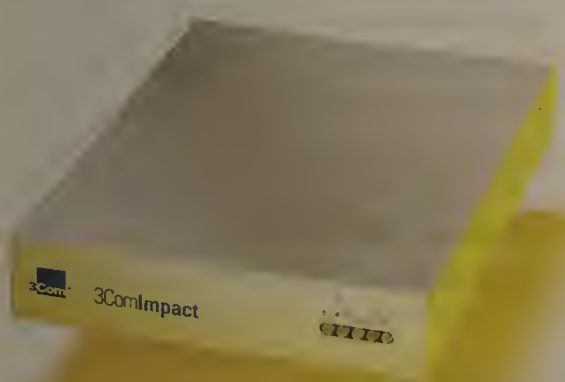
- **DirecPC $699, plus $450 for installation; Hughes Network Systems; 800/347-3272**

  Reader service no. 857

BELOW, LEFT: RAY NG; ABOVE, RIGHT: MARK ALCAREZ

ly tops out at 115 kbps; internal devices bypass the serial port for full 128-kbps performance.) The product uses IBM's Mwave digital signal processor (DSP) technology so it can either act as a digital modem or emulate a 14.4-kbps analog modem.

However, setup is a challenge that should be attempted by only the hardiest of souls. As with other non–Plug and Play internal modems, you may have to set IRQs and DIP switches; the WaveRunner's procedures for setup and testing do little to simplify the process. The software comes on three disks and requires you to enter data on multiple screens. The manual is obtuse and riddled with jargon. And IBM's support was weak: When we called the company after NetManage Chameleon failed to recognize the WaveRunner, a tech support representative said we'd have to fork over $35 for assistance with software problems—or call NetManage. The $511 WaveRunner requires an external NT-1 interface, which adds another $150 to the price. It doesn't work with Win 95 yet.



TOP CHOICE: The $499 3Com Impact ISDN modem is easy to set up and configures itself to work with software applications.

IBM also sells a PC Card version of the WaveRunner. By using the same DSP as the ISA card product, it too can emulate a 14.4-kbps modem, and it also includes a true 28.8-kbps analog modem. Thus, when you're in the office, you plug the $558 card into an NT-1 and you have 128-kbps performance. When you travel, bring only the card and you've got a 28.8 fax-modem.

Down the Line

ISDN service is becoming more widely available. It's now an option for virtually all city dwellers in the United States and 70 percent of those who live or work in suburban areas, says Sanjay Mewada, an analyst at Yankee Group Research. He estimates that by next year, service will be available to anyone in suburbs who wants it. However, availability in rural areas is spotty and is expected to stay that way for some time.

Increased access means that more Internet service providers and online services will offer ISDN connections. Currently Internet ISDN service is widely available

Resources to Get You Started With ISDN

Books

ISDN for Dummies $19.99; IDG Books; 800/762-2974 (IDG Books and *PC World* are both owned by IDG)

ISDN Solutions free; Corporation for Open Systems; 800/759-2674

Using ISDN $29.99; Que; 800/772-0477

User Groups

Bellcore ISDN hotline, 800/992-4736

California ISDN Users' Group, 415/241-9943

North American ISDN Users Forum, 301/975-2937

Web Sites

Dan Kegel's ISDN Page (http://www.alumni.caltech.edu/~dank/isdn/). Virtual user group for ISDN includes news, tips, and links to related sites.

Get ISDN Now (http://www.microsoft.com/windows/getisdn). Online assistance in ordering ISDN service and hardware.

ISDN Contacts (http://info.bellcore.com/ISDN/contacts.html). Contacts and phone numbers for ordering ISDN in your area.

ISDN Info Centre (http://www.isdn.ocn.com/). Best place for ISDN newbies to start. Also offers tips and links to many related ISDN sites.

Breaking News

(continued from page 49)

tial customers and 10 million business customers 5 hours of free connect time per month; unlimited access will cost $19.95 a month. In addition, AT&T will route users to AOL—and is pursuing deals with CompuServe and Prodigy. The company plans to offer access to these online services through WorldNet, much the way that cable providers sell access to TV networks like HBO and ESPN. —G. M.

PENTIUM PRO BUG: The Orion chip set used in early Pentium Pro PCs has a bug that causes systems to slow down during processing. Unlike the math flaw discovered last year in the Pentium chip, this defect does not affect data integrity. Intel has released a revised Orion that fixes the problem, says spokesperson Howard High, and most systems using the Orion chip set already include a work-around that makes the bug invisible to users. But customers who purchased Pentium Pros from small vendors should ask if the work-around is included. —G. M.

CENSORSHIP SHOWDOWN: PC industry heavyweights have joined the fight against the 1996 Telecommunications Act's "decency" provisions. On February 26, the Citizens Internet Empowerment Coalition and 22 plaintiffs including AOL, CompuServe, Prodigy, Apple, Netcom, and Microsoft challenged the provisions in court. The

(continued on page 53)

PHOTO: GIAMPIERO BENVENUTI; ILLUSTRATION: JEFFREY PELO

Tips to Avoid Aggravation

1. **Do your homework.** Before buying a digital modem, call your local phone company to determine if ISDN service is available in your area, and check costs. Then, verify that the applications and online services you want to use support ISDN.
2. **Check under your PC's hood.** External digital modems require a serial port with a 16550A or faster UART chip and appropriate driver software, which is typically bundled with the modem. (High-speed serial port cards cost about $50.)
3. **Be prepared.** Have your PC, modem, serial port, and serial port driver and application software installed before the phone technician shows up—and test the line before the technician leaves.
4. **Cry uncle.** Don't waste a lot of time trying to figure things out. Once you're stuck, call for help. Try your modem vendor first, then your Internet provider.

from both national and regional Internet providers. Among major online services, the Microsoft Network and CompuServe are the leading supporters of ISDN. Prodigy is testing ISDN connections, but they're not widespread. AOL doesn't offer ISDN but may add it sometime in the future.

As for pricing, expect ISDN service to remain in the range of $34 to $200 for installation, with monthly charges from $20 to $80. (Prices vary depending on myriad factors.) ISDN modems should continue to drop in price: For instance, Cardinal Technologies has announced an internal modem with built-in NT-1 for only $199.

Perhaps the best way to get started with ISDN is a package that offers one-stop shopping for hardware and ISDN services. For instance, you can walk into a Fry's Electronics in California, purchase a 3Com digital modem, and order both an ISDN line from Pacific Bell ($34 for installation and $24.50 per month, plus per-minute charges) and ISDN Internet service from InterNex Information Systems ($14.95 for 15 hours). Expect to see more such ordering arrangements offered elsewhere this year.

ISDN is more viable than ever before. If you do a lot of Net surfing and are willing to endure some hassles getting set up, it's definitely worth the money. But hang on to your trusty old analog modem—or buy an ISDN modem with analog support—to reach people and services that can't or won't upgrade to ISDN.

—Randy Ross

3Com Impact

3Com, 800/638-3266
Pricing: $499, with 14.4-kbps modem $749
Reader service no. 858

Courier I-modem

U.S. Robotics, 800/877-2677
Pricing: $895
Reader service no. 859

IBM WaveRunner

IBM Corp., 800/426-2255
Pricing: ISA card $511, PC Card $558

Cable Links, Faster Phones—Someday

The cable and phone companies are working on technologies that are five or six times faster than ISDN. But don't hold your breath: Ultrafast phone service and cable modems won't be widely available for at least two years.

One option is an ultracompressed digital data format called ADSL (asymmetric digital subscriber line) that runs over conventional phone lines and can support speeds of up to 1.5 megabits per second in its first iteration—more than ten times faster than ISDN. Future versions of ADSL could run at up to 6 mbps. But those speeds are attainable only in one direction—typically from the service provider to your home. ADSL's two-way transmissions top out at 640 kbps. GTE and longtime ADSL booster Bell Atlantic are running trials this spring in Dallas and Virginia.

Cable modems will also offer blazing speed—but with limitations. These devices, which connect PCs to cable TV wiring, now support data rates of up to 10 mbps, with 30-mbps speeds planned in the future. One hitch is that you have to share that bandwidth with your neighbors, which could result in actual performance closer to 500 kbps. Also, data you send from your home travels at only about 128 kbps. A dozen cable modem trials are under way in the United States and Canada. But studies show that fewer than 10 percent of American homes are now served by cable systems capable of handling two-way communication. —Owen Linderholm

CONNECTION OPTIONS COMPARED

	Receive speed (kbps)	Send speed (kbps)	Availability	Approximate cost (hardware and setup + service)
modem	28.8	28.8	now	$200 to $350 + $20/month
ISDN	128	128	now	$580 + $40/month
satellite	400	28.8	now	$1150 + $30/month
T1 line	1540	1540	now	$2000 + >$185/month [1]
ADSL	6000	640	2 to 3 years	$300 to $500 + $30/month [2]
cable	500 [3]	128	2 to 3 years	$300 to $500 + $30/month [2]

[1] Rate varies by distance. [2] Industry projections. [3] 30 mbps split among 60 simultaneous users.

GORDON STUDER

Cheaper Flat Panels on the Way

A quality color notebook screen never fails to elicit oohs and aahs. With vibrant colors, crisp lines, no flicker, and virtually no potentially harmful emissions, flat panels might be more commonly packaged and sold for desktops if not for their sky-high prices.

Now monitor giant NEC is starting to bring the cost of desktop liquid crystal displays closer to earth. The new 12-inch NEC MultiSync LCD200 sells for $3999 and supports resolutions of up to 1024 by 768; the 13-inch MultiSync LCD300 costs $5999 and tops out at 1280 by 1024. These displays may sound small, but in fact a 12-inch LCD has very near the screen area of a 14-inch CRT monitor, and the LCD300 comes similarly close to a 15-inch CRT.

Meanwhile, Sceptre, a small vendor of notebooks and monitors, has unveiled a 12-inch display with 800 by 600 resolution priced at only $1999—incredibly low for a flat panel. The company also plans to release 13- and 15-inch models by summer.

Still, $2000 is more than eight times what you'd spend for an ordinary 14-inch CRT. The expense is inherent in the technology: The NEC and Sceptre displays are active-matrix LCDs, the same type used in top-of-the-line notebooks. Sceptre's less expensive CDT-1112T is little more than a 256-color laptop screen packaged for the desktop, but NEC's products incorporate a number of innovations—in particular, the ability to display 16.8 million colors.

Wayne Hinson, vice president of NEC's MultiSync division, predicts that by the year 2000, the number of active-matrix desktop displays sold will match the number of 17-inch monitors. Others are less sanguine, arguing that active-matrix LCDs won't make economic sense for mainstream desktop PCs in the near future.

THIN AND CRISP: NEC's new flat-panel desktop display has razor-sharp 1024 by 768 resolution—and costs a cool $4000.

Virtually all Japanese monitor makers, plus Texas Instruments and Motorola, are also working on *field emission displays*, bright, flat screens that are a cross between CRTs and LCDs—and priced somewhere in between. "Flat-panel is the biggest wild card in the display business," says David Mentley, an analyst for Stanford Resources.

—Eric Knorr

NEC MultiSync LCD200, MultiSync LCD300

NEC Technologies, 800/374-8000
Pricing: LCD200 $3999, LCD300 $5999
Reader service no. 780

Sceptre CDT-1112T

Sceptre Technologies, 818/369-3698
Pricing: $1999
Reader service no. 781

Breaking News

(continued from page 51)

U.S. Circuit Court of Appeals in Philadelphia was scheduled to hear the group's request for a preliminary injunction on March 21, and on April 11 government lawyers were to present their case; a decision could be issued by this summer. An appeal to the Supreme Court is almost certain to follow, says the coalition's Jonah Seiger. To get involved, visit the group's home page (http://www.cdt.org/ciec/index.html). —L. M.

TIDBYTES: Suing for Support: Some PC owners are so tired of hearing a busy signal on the tech support line that they're suing. Three customers of Westborough, Massachusetts–based Leading Edge charge that the company has acted negligently and fraudulently by offering unsatisfactory support. For more information, contact plaintiff's lawyer Dan Drachler at 212/223-3900...The Florida Revenue Department may tax Internet usage—at rates as high as 7 percent. Critics argue this levy amounts to double taxation, since telephone service is already taxed. If the scheme works, states such as California and Illinois may follow suit...Consumer Alert: Austin-based computer maker CompuAdd shut down operations and stopped taking sales orders in March. Portions of the business were being sold at press time. CompuAdd says it will continue to take tech support calls from existing customers.

PHOTOS: JOHN GREENLEIGH; ILLUSTRATION: JEFFREY PELO

P-133 Notebooks Rival Desktops

TEST DRIVE

True desktop performance has just become portable. Micron and Dell are now offering 133-MHz Pentium notebooks that are not only the fastest we've ever tested, but also the first that actually match the performance of their desktop counterparts. The Micron Millennia TransPort P133c and Dell Latitude XPi P133ST beat the average speed of other 133-MHz Pentium notes we've tested by around 25 percent.

Both systems sport the latest 133-MHz Pentium chip, which is designed specifically for notebooks. The chip runs cooler, draws less power, and is smaller than desktop Pentium CPUs. These systems also include new chip sets, featuring more efficient PCI implementation. This one-two punch gives the notebooks their zip. By contrast, slower 133-MHz portables we've tested use Intel's standard desktop version of the CPU and older chip sets.

The Dell and Micron systems offer beautiful 11.3-inch SVGA active-matrix screens, removable hard drives in the 1.2GB range, and infrared ports. But the similarities end there. We were most impressed with the Millennia, whose base configuration includes an array of performance-enhancing hardware and multimedia features. The $4899 unit we tested came with 16MB of EDO RAM and 256K of pipeline-burst cache. Its sleek, modular design boasts two expansion bays, either of which can house a floppy drive, hard drive, or quad-speed CD-ROM drive (all included), or an extra battery. Another nice touch is an S-video port, for connecting a video camera, and an NTSC output port, for hooking up to a television.

The Latitude offers the basics, such as EDO RAM and 256K of cache, but fewer extras. We did like the new optical trackball, which is larger than the norm and gives a noticeably smoother ride than the trackball in older Dell units. The lithium-ion battery powered the notebook for a tolerable 2.5 hours in our tests. Though this battery life isn't much compared to that of slower notebooks, it's still better than what we've seen in other 133-MHz Pentium portables. One performance note: The $5199 system we tested had 24MB of RAM, which we estimate enhanced its benchmark performance by less than 10 percent over the same system with only 16MB of RAM. Base prices start at $2999.

More 133-MHz Pentium notebooks are on the way. By the end of March, Digital plans to ship the $4699 HiNote Ultra II CTS 5133, which has a 10.4-inch SVGA active-matrix screen and 1.35GB hard drive. HP will follow with the OmniBook 5500 CT 5/133 Model 1350, which features a 12.1-inch SVGA active-matrix screen, built-in 4X CD-ROM drive, 1.35GB hard drive, and S-video and NTSC output. No price was available at press time. Toshiba has announced the Tecra

FULL STEAM AHEAD: Micron's Millennia TransPort P133c runs as fast as P-133 desktops and comes loaded with options.

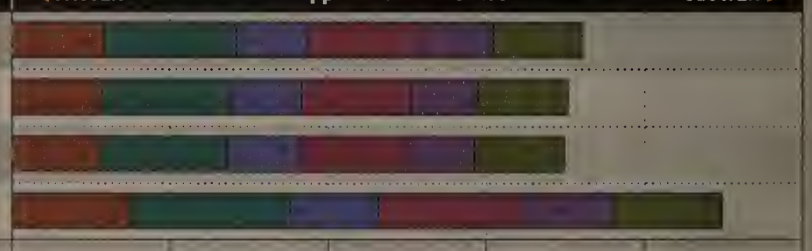
A NEW OPTICAL TRACKBALL and better battery life set Dell's Latitude XPi P133ST apart from other 133-MHz notebooks.

GIAMPIERO BENVENUTI

TEST REPORT

Closing the Performance Gap: New Dell and Micron P-133 Notebooks Equal Desktop Counterparts

PC WorldBench score		CPU	RAM (MB)	Secondary cache (K)
172	Dell Latitude XPi P133ST	Pentium-133	24	256
178	Micron Millennia TransPort P133c	Pentium-133	16	256
180	Average of 20 P-133 desktops	Pentium-133	16	256
138	Average of 3 other P-133 notebooks [1]	Pentium-133	16	256



[1] One from Broadax and two from Eurocom.

Word 7.0 | Excel 7.0 | Picture Publisher 6.0 | Paradox 5.0 for Windows | WordPerfect 6.1 for Windows | 1-2-3 release 5 for Windows

Methodology Higher PC WorldBench scores are better. For a description of the PC WorldBench test suite, see "Pentium-166: The New Standard of Power."

Data based on PC WorldBench testing conducted by the PC World Test Center.
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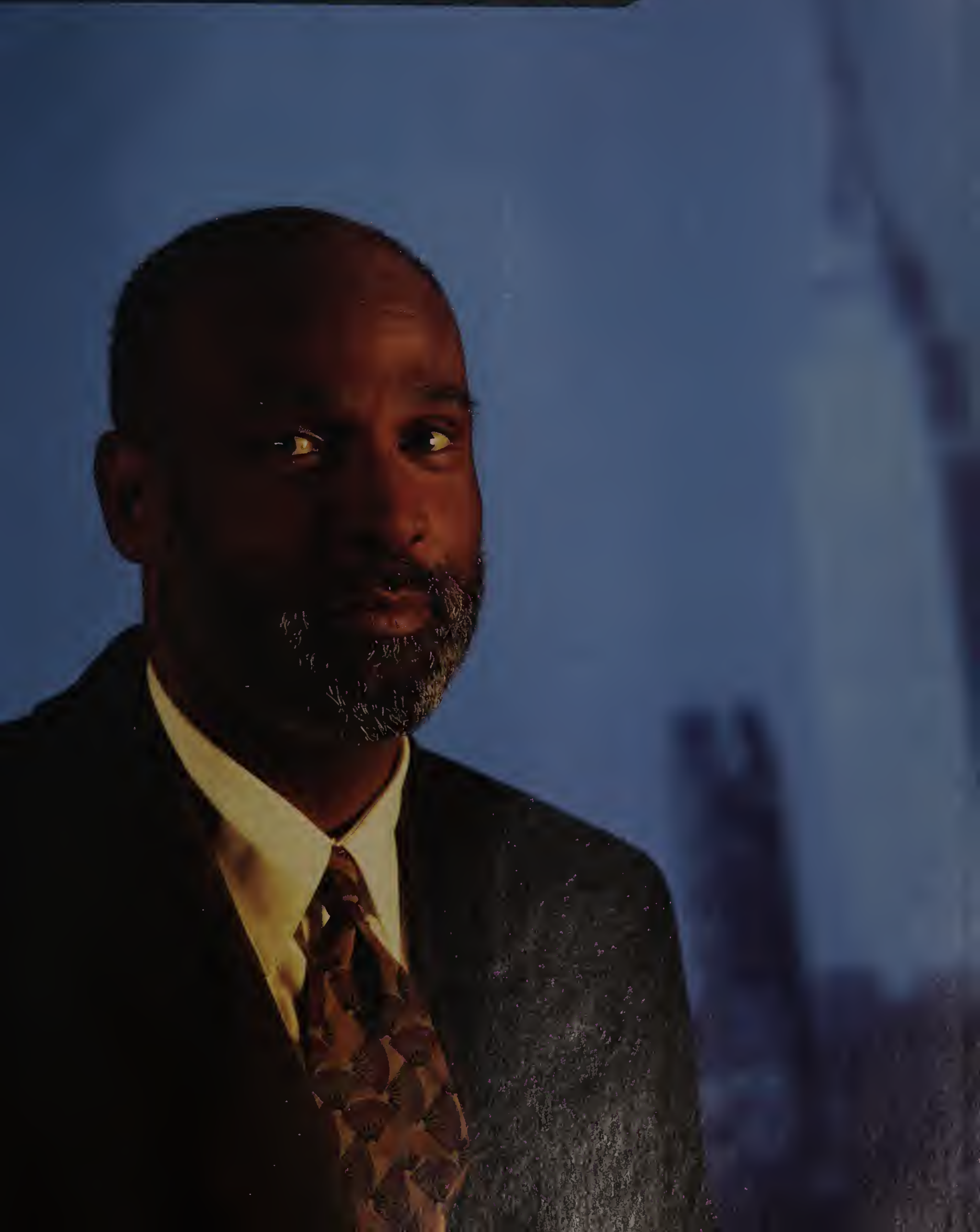
Has lived in New York all his life.
Never visited the Empire State Building.



720CDT, with prices starting at $7499. The base model offers a 12.1-inch SVGA active-matrix screen and 2MB of EDO video RAM. This is the first notebook we've heard of that offers a Zoomed Video Port, which supports full-screen, full-motion video (see "What's Ahead for Notebooks" for more on this technology). We'll try each of these products as soon as we can get our hands on 'em. **—Susan Silvius**

- **Dell Latitude XPi P133ST** from $2999; Dell Computer; 800/613-3355
  Reader service no. 850
- **Digital HiNote Ultra II CTS 5133** from $4699; Digital; 800/344-4825
  Reader service no. 851
- **HP OmniBook 5500 CT 5/133 Model 1350** price unavailable at press time; Hewlett-Packard; 800/443-1254
  Reader service no. 852
- **Micron Millennia TransPort P133c** from $4799; Micron; 800/223-6571
  Reader service no. 853
- **Toshiba Tecra 720CDT** from $7499; Toshiba America; 800/457-7777
  Reader service no. 854

What's Ahead for Notebooks

Mobile systems may be catching up to their desktop cousins, but engineers aren't resting on their laurels. Here's a sampling of new technologies set to arrive in the next year.

Brighter, less energy-hungry screens: Sharp has unveiled its Super High Aperture Ratio LCD, which is 35 percent brighter with no added battery drain. By reducing the size of the screen's transistors, Sharp lets more light shine through each pixel. The company will use these screens immediately in some of its 9000 series notebooks; other portables using them could come to market this spring.

Lighter, more powerful batteries: Keep your eyes peeled for lithium-ion batteries made of solid polymer material. This flexible medium can be shaped to fit in your notebook as unobtrusively as possible, with widths as narrow as a quarter of an inch. Lithium-ion polymer weighs 20 percent less than alternatives with comparable energy delivery. One of the first players in this field is Ultralife Batteries, whose first products should become widely available this year.

Faster PC Cards: One performance hurdle for notebooks is I/O speed. The 16-bit PC Card specification is a bottleneck for add-ins such as network interfaces and removable hard drives. But a new 32-bit Card Bus spec has been approved, and in the second half of 1996 you'll see notebooks supporting the faster standard.

Full-screen, full-motion video: The new Zoomed Video Port standard brings high-quality video to notebooks while lightening the load on the CPU. ZV Port cards bypass the PCI bus, making it easier for notebooks to play back MPEG-1 and MPEG-2 digital video. **—Eric Hellweg**

Bug Watch Norton Utilities and QEMM Tangle With Windows 95

Norton Utilities 95: Disk Usage and File Errors, Quicken Quirk

▶ **Bugs:** If you use Norton Utilities for Windows 95's Protected Recycle Bin feature, Windows Explorer and the dir and chkdsk commands may report more free disk space than exists. Norton Utilities also disables Win 95 safeguards that prevent files from being inadvertently destroyed by an incorrect DOS command. And if you install Intuit's Quicken 5.0 Deluxe, then install or uninstall Norton, the next time you start your PC the Windows 95 graphical interface won't load and an error message will instruct you to reinstall Win 95.

▶ **Fix:** Symantec has a patch that solves these problems and adds better Speed Disk support for compressed removable drives. The patch also allows Norton Disk Doctor to diagnose and repair file and directory errors on drives compressed with Stac's Stacker versions 3.1 through 4.1. Symantec warns that even with the patch, you shouldn't use Disk Doctor to repair Stacker compression structure problems discovered during Disk Doctor's Thorough Surface Test (use the Check utility instead). Download a self-extracting archive file (nu95ptch.exe) containing the patch on CompuServe (go symantec), AOL (keyword symantec), or MSN (look in the Computers & Software area).

Quarterdeck QEMM 8.0's Strange Ways—and a Patch

▶ **Bugs:** If you manage Win 95 memory with QEMM 8.0, you may run into one of the following problems: a 'Configuration too large for memory' error (usually when DriveSpace 3 in Microsoft Plus is installed); 'Exception #13 at address FFFF:FFFF' errors; and long delays or freeze-ups when using MagnaRAM with caching IDE controllers. QEMM's Resource Manager utility conflicts with several apps (notably AutoCAD) and some XGA and 8514 video cards. Also, Manifest may misidentify Cyrix CPUs and Trident video chips.

▶ **Fix:** Quarterdeck's QEMM 8.01 patch fixes these problems, and also lets you keep the memory status window always on top and edit the Windows 95 msdos.sys configuration file from the Manifest and Qsetup utilities. You can download a self-extracting archive file (800to801.exe) containing the patch from Quarterdeck's BBS (310/309-3227), CompuServe forum (go quarterdeck), or Web site (http://www.qdeck.com/qdeck/products/QEMM/patch.html). **—Scott Spanbauer**

Found a hardware or software bug? Call us at 415/978-3253, or post your report on PC World Online. We'll try to dig up a fix.

ILLUSTRATION, ABOVE: GORDON STUDER; BELOW, JEFFREY PELO

Was born and raised in Paris.
Has never been to the top of the Eiffel Tower.

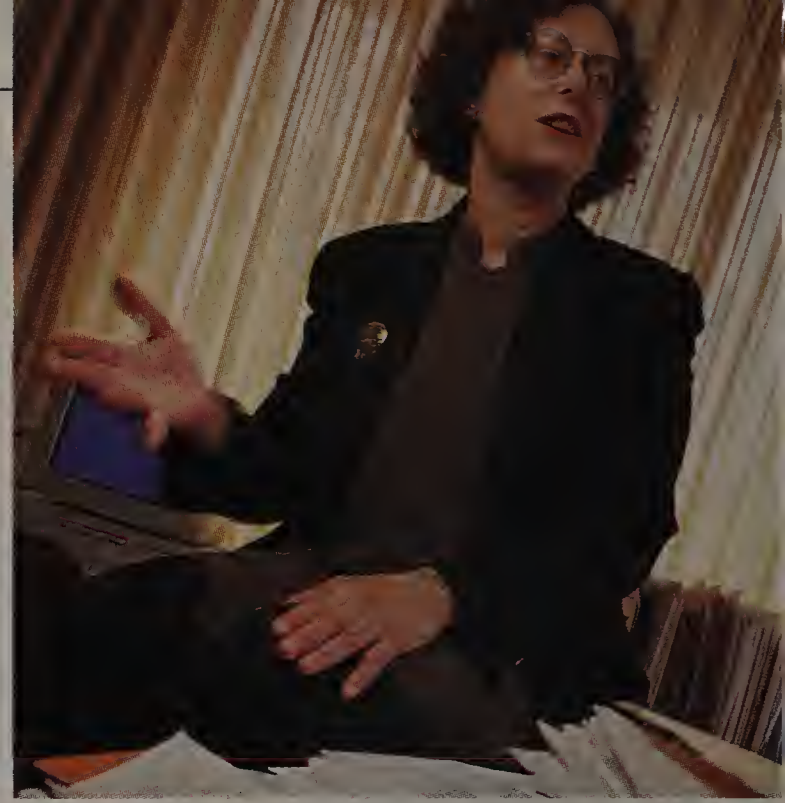
Telecom Reform: Next Steps

Since the Telecommunications Act passed in February, the public's attention has focused on the parts of the law aimed at curbing "indecent" material on the Internet—provisions that are already being challenged in court. But what will other parts of the act, the most sweeping overhaul of telecom policy in 60 years, mean to you? Will deregulation and competition bring more choices and lower prices for phone service, cable TV, and Internet access? Or will a few giant companies dominate the market, damping incentive for innovation and price cuts?

Varying opinions are already emerging. "More people are going to have access to high bandwidth [networks] than ever before," says Marc Andreessen, vice president and cofounder of Netscape Communications. But phone and cable firms spent millions lobbying for the law. "And they didn't hire an army of lobbyists to make rates go down," says James Love, director of the Consumer Project on Technology.

The act will allow vendors to merge, invade each other's territories, and offer one-stop shopping for phone, TV, and Internet service. This could be a great convenience—or it could mean that a few companies control not only access rates, but also online and video content. Over the next 12 months, you can expect a flurry of business and service announcements. The land rush is already under way: US West plans to buy Continental Cablevision, and AT&T has unveiled a nationwide Internet service priced at only $20 per month for unlimited access.

Many details of the new world order haven't been finalized: Some 80 issues, such as how much local phone companies can charge other firms to use their networks, sit before the FCC for rule making during the next two years. Also, some lawmakers are pushing for follow-up legislation to refine the telecom policy. "You can expect to see some of the unresolved issues back on the table," says Rep. Rick Boucher (D-Va.), who plans to revisit the law this summer.



BREAKING THE MONOPOLY MIND-SET: Activist Audrie Krause doubts the new law will spur true competition.

Competitive Long Distance

The first effects of the legislation will likely appear on your long-distance phone bill, when the regional "Baby Bell" companies enter the long-distance market. The new law allows them to sell long-distance service outside their operating regions now, and within their regions after they've dismantled barriers to local competition from other firms.

The Baby Bells will have to offer low long-distance rates to lure customers, says Ken Robinson, a Washington lawyer and editor of the *Telecommunications Policy Review* newsletter. "I can't believe the long-distance rate increases we've been seeing since 1993 will continue," he says.

The law also allows AT&T, MCI, Sprint, and cable companies to compete in the local phone market. MCI is striking fast: It has already unveiled local service in Boston, and analysts expect it to set up service in 25 other cities this year. AT&T will weigh in by late summer or early fall, offering "very competitive" rates, says company spokesperson John Heath. AT&T also plans to offer bundles of local, long-distance, cellular, and satellite TV entertainment services, Heath says.

On the other hand, cautions Jeff Kagan, president of telecommunications market researcher Kagan Telecom Associates, "in the short term, the Baby Bell companies may actually raise local service prices to help pay for other services they want to start."

How the New Telecommunications Law Will Affect You

Long-distance phone service	Regional Bell operating companies can sell long-distance outside their areas now and inside their areas once local competition exists. Expect lower long-distance rates within months.
Local phone service	Long-distance carriers and cable companies can offer local phone service. AT&T will provide a good deal of local service by fall; cable companies will start service in limited locations next year. Local rates could actually rise until competition is in place.
Cable TV	The law eliminates cable TV rate regulation within three years. Cable companies need to make money for other ventures, so rates will probably rise, starting in small communities.
Internet access and online content	New choices are on the way. Telephone companies will push ISDN and ADSL service; cable companies will offer cable modems in limited areas this year. You'll get faster Web surfing, but vendors could gain greater control over online content.
Media concentration	Eases restrictions on the number of TV and radio stations a company can own. Increases the likelihood of consolidations and mergers among phone and cable companies. Both camps want to sell you phone, multichannel video, and Internet access.
Digital broadcast spectrum	Designates airwaves being saved for digital television as free for TV networks. Citizen groups and some legislators are pushing for this spectrum to be auctioned. Congress will likely debate the topic again this summer.
Censorship	Requires TV manufacturers to install the "V chip" so parents can block children from violent or sexual programming. Prevents online services and users from posting "indecent" material that kids could access. The provisions face court challenges from corporate and civil liberties plaintiffs.

PHOTO: ROBERT HOLMGREN; ILLUSTRATION: GORDON STUDER

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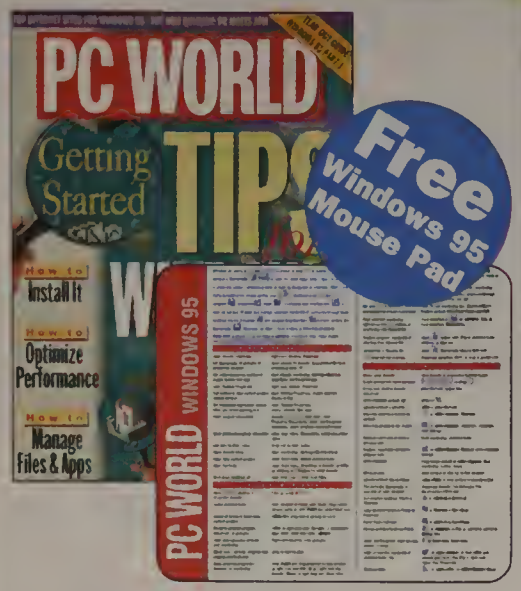

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Microsoft

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What about customer service? Over the next two years, communications companies will fight hard to woo customers—so you may see better service, Kagan predicts. But Audrie Krause, executive director of Computer Professionals for Social Responsibility, disagrees. "As oversight lessens, service will dramatically decline," she says. "If there were true competition, those who provide good service at a reasonable cost would succeed. But these companies have a monopoly mind-set."

GETTING INVOLVED

For more information about the telecommunications bill and groups working on this and other issues, check out the Telecom Information Resources on the Internet site (http://www.spp.umich.edu/telecom-info.html), which has a huge list of links. Start voicing your opinion regarding the kind of information superhighway that you want. "After all," says the CFA's Bradley Stillman, "you're a taxpayer, so you should be involved in the decision."

New Options for Internet Access

Depending on where you live, you may also see new choices for Internet access this spring. Given that analog modems are running out of steam, phone companies will heavily market ISDN—and invest in ultrafast ADSL (asymmetric digital subscriber line) technology (see "Cable Links, Faster Phones—Someday"). Cable companies also want a piece of this market, luring customers with modems that attach to your CATV coaxial cable and offer data communication at rates of up to an ethernetlike 10 mbps—and someday 30 mbps. But nationwide, cable modems won't take off for at least 18 months. The biggest roadblock: Cable systems have to be revamped to support not just video, voice, and data signals that go into subscribers' homes but also "upstream" data from users. Less than 10 percent of the country now has such a cable infrastructure, and until the systems are upgraded, cable companies can't provide two-way services over their wires.

RESTRICTIONS ON ACCESS could stifle content, worries Bradley Stillman of the Consumer Federation of America.

Fighting to Control the Net's Future

One troubling aspect of the new law, say observers, is its abdication of the requirement that telecom providers must be "common carriers" whose wires transmit any content. Even if the indecency provisions of the law are repealed, companies may not act like common carriers in the future. For instance, in a Time Warner cable modem trial, customers pay $15 a month for basic access to selected Web sites (including those for several Time Warner magazines), but full Net access costs an extra $10 per month. The effect of such pricing schemes could stifle content, warns Bradley Stillman, telecom policy director for the Consumer Federation of America. "The cable company would effectively be the Internet service provider, and they will want to control content," he says.

Rep. Boucher tried but failed to insert an "open platform" provision in the telecom bill to give competing programmers access to future networks. As with many details of the law, refinements are inevitable. "I'm not through with that issue," Boucher says.

—Laurianne McLaughlin

The Web Browser: Virtual Worlds Presage 3-D Future

These are pioneer days for 3-D worlds, and in them we may glimpse the future of interactive computing. Why use menus and icons when you could navigate through a mock-up of your office—or the local mall? The oldest cyberspace station, Worlds Inc.'s Worlds Chat (http://www.worlds.net/), attracts a crowd as bizarre and diverse as the cantina in *Star Wars*. The company's new AlphaWorld is a community where netizens claim land and build on it with objects; we might see banks and shops there someday...The newest entrant is Black Sun Interactive, whose PointWorld (http://www2.blacksun.com/pointworld/index.html) renders in 3-D the Point Communications Web site reviews. To pick a site, you maneuver to a virtual building and click on it. You end up at normal Web pages, but this use of virtual reality could set the pace for fronting databases with 3-D...Utopia, from Onlive Technologies (http://www.onlive.com/), adds sound: Instead of typing what you want to say to people, you speak through a mike and your voice issues forth from your on-screen stand-in. Utopia could take group conferencing to a new level. —Richard Overton

FINDING WEB SITES goes 3-D in PointWorld. Each building here represents a subject area that you can click on and enter.

PHOTO: WALTER CALAHAN

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(It also occurred to us you might want other options.)

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Powerful Pentium-166s Come Out and Play

As we predicted in our February issue (see "Unripe Today, Sweet Tomorrow," *Top of the News*), the second round of 166-MHz Pentium computers shows off the processor's power. We looked at the Dell Dimension XPS P166s—which sports Dell's new chassis design—and the AST Bravo MS 5166. Both of these systems came loaded with lots of new features and components.

CHASSIS FULL OF CHOICES: Dell's redesigned chassis has better on/off button placement and extra drive bays.

Desktop's New Dimensions

The new Dell Dimension XPS P166s brings state-of-the-art technologies to the desktop. For starters, Dell says that the Dimension's combination of Intel's 430VX PCIset (formerly known as the Triton VX chip set) with SDRAM (Synchronous DRAM) is faster than the same chip set with Extended Data Out RAM.

Our tests on a preproduction model gave the system an overall PC WorldBench score of 202, which isn't bad; it's about twice the speed of our Dell P75t reference system. The first Dell P166 that we examined, a shipped-model Dimension P166c with 32MB of RAM, rated a WorldBench score of 208. With additional tweaking to the system, the XPS P166s machine should really fly.

The computer we looked at came with a 2.5GB EIDE hard drive, 16MB of SDRAM, and 512K of secondary cache. SDRAM is a new type of memory that's supposed to be faster than EDO RAM, which is standard in many high-end systems these days. Dell also moved to the use of DIMMs (Dual Inline Memory Modules), small memory boards that hold twice as much memory as SIMMs—you can use one 16MB DIMM module instead of two 8MB SIMM modules in your PC.

Additionally, Dell includes the Creative Labs Vibra 16 chip for built-in 16-bit FM synthesis sound, which can be upgraded to 32-bit wavetable with a Creative Labs sound card add-on (for $50). The base model includes the Number Nine Imagine I, but if you don't mind the extra cash outlay, you can also have Number Nine's Imagine II card ($50) onboard for high-end video graphics capabilities.

The Dimension XPS P166s will be the first Dell system to show off its redesigned chassis. Externally, you'll see niceties like a big on/off button in the center of the case and a larger reset button. These are terrific changes from the current buttons, which are so close to the 3.5-inch floppy drive that it's easy to turn off your PC when you try to pop out a disk. And the Dimension gives you room to grow: Two 5.25-inch bays and three 3.5-inch bays are stacked along the front. A 6X CD-ROM drive is standard (Dell plans to move eventually to an 8X drive).

Bravo! Speed and Sound in One

AST Computers chose to use EDO RAM, with 32MB of RAM (expandable to 192MB) in the preproduction system we tested. The new AST Bravo MS 5166 uses Intel's 430HX PCIset (formerly known as the Triton II chip set). Both the 430HX PCIset and the 430VX PCIset feature Concurrent PCI, which allows PCI and ISA buses to execute transactions simultaneously.

The Bravo includes 256K of pipeline-burst secondary cache and integrated 64-bit ATI VT graphics support. A 2GB hard drive, a 6X CD-ROM drive, three half-height 3.5-inch floppy drives, and two half-height 5.25-inch drive bays are also standard. Shipping Bravo systems will come with 16MB of EDO RAM.

Multimedia support includes 16-bit Sound Blaster–compatible sound and stereo headphones. The headphones include a built-in microphone.

The system we examined zipped through the PC WorldBench tests with an overall score of 207. With final tuning to the system's components, you can expect the AST (which should be available this month) to be faster, even with 16MB of RAM.

Choosing the Dimension or the Bravo will depend on what kind of options you're looking for in a new desktop PC. Certainly both will provide quick processing power and a lot of memory, but the AST is several hundred dollars less.

—Gabrielle Mitchell

AST Bravo MS 5166

High-end business machine.
AST Computers
800/876-4728
Street price: $2611
Reader service no. 712

Dell XPS P166s

Speedy minitower benefits from chassis redesign.
Dell Computer Corp.
800/289-3355
List price: $3199
Reader service no. 713

The Future of PDAs Just Got Brighter

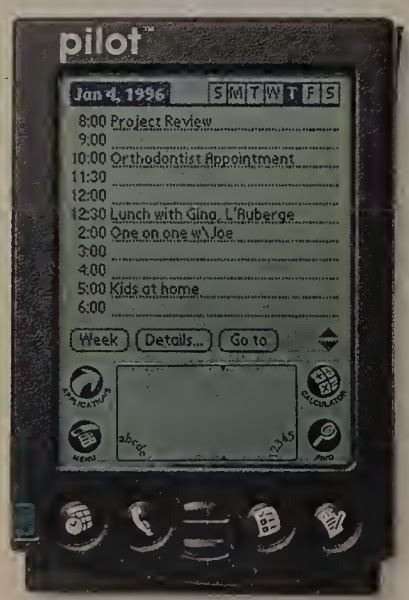
The personal digital assistant has been the Sharon Stone of computers—fun, sexy, and not to be taken seriously. But no longer: Stone recently received her first Oscar nomination, and several new PDAs, with such features as screen backlighting and enhanced data communications and synchronization, are on their way to earning some respect, too.

Of the three new PDAs I evaluated—Apple Computer's MessagePad 130, Palm Computing's Pilot, and Sharp's Zaurus ZR-5800—the Pilot is bound to receive the lion's share of the limelight, even though it's the only one without a backlit screen. (The backlight is best described as "Ghostbuster green" for the Sharp and Apple devices.)

THE NEW ZAURUS ZR-5800 features a backlit screen and enhanced connectivity, as well as a PC Card Type II slot for added storage.

Pilot Flies Right

If nothing else, the Pilot gets the award for Highest Gee-Whiz Factor: Designed to be an extension to the PC, the Pilot is not much bigger than a deck of cards, runs on two AA batteries, slips easily into a coat pocket, and weighs a puny 5.7 ounces. The street price—$299—is also blessedly small.



THE PILOT'S BUTTONS make it easy to launch applications.

The Pilot includes a handful of built-in apps, including a calculator, to-do list, address book, and calendar. It also comes with a Windows-based program with which you can synchronize the PDA's data. But your PC's PIM or contact files must be converted to .csv, .tsv, or .dbf formats before downloading, a tedious process. A number of software companies, such as Starfish Software and IntelliLink, have announced programs for the Pilot that promise direct links to their Windows counterparts. The Pilot has a pen-based user interface and uses Graffiti handwriting recognition software.

Apple Discovers Backlighting

Meanwhile, Apple's 1-pound (without batteries) MessagePad 130 gets the nod for Most Improved PDA. Among the 130's new features is a nonglare screen with much-welcome backlighting that significantly improves your ability to see what you're writing in a darkened conference room. Conveniently, you can set the backlighting to remain on or to shut off after a preset time.

In addition, the MessagePad 130 now includes 2.5MB of RAM, which should make it easier to multitask. It also includes one PC Card Type II slot. It runs on four AA batteries for between 40 and 60 hours. Be forewarned, though: With a street price of $799, the MessagePad 130 is one of the most expensive PDAs around.

Zaurus Connectivity Looks Sharp

Sharp's pricey Zaurus PDAs take home Best Supporting Actor. The Zaurus ZR-5800 is $649; the ZR-5800FX, which we did not test, is $749 and includes a 2400/9600 fax-modem.

For the latest Zaurus, which runs on two AA batteries, Sharp includes preloaded versions of CompuServe, AT&T Mail, and pager software. Also available is the Zaurus Applications Partner ($149), a software/infrared adapter bundle for shuttling files between a PC and a Zaurus.

This PDA weighs less than a pound. With its miniature QWERTY-style keyboard, pen-based user interface, and a host of built-in applets, the Zaurus is more like a bonsai version of a PC than a typical PDA.

Pocketful of PDAs

So which PDA is for you? Choosing a device depends on your personal needs. If a simple organizer will suffice, the Pilot is the way to go. For broad functionality, you may prefer the MessagePad. The Zaurus is the one for minor computing chores and lots of connectivity options.

—James A. Martin

Pilot

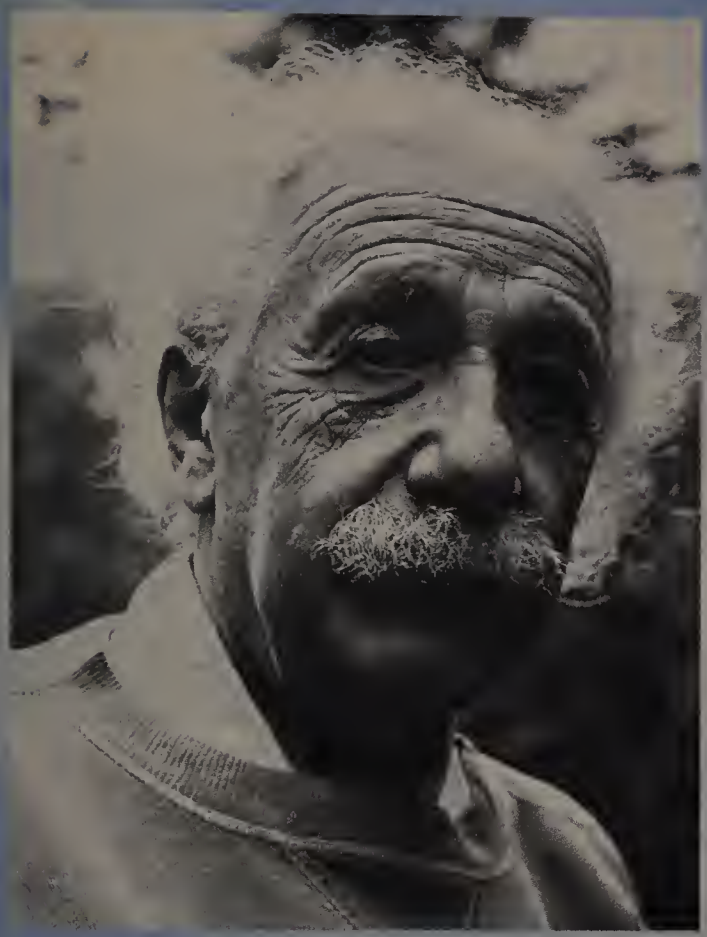
Compact and inexpensive; few built-in programs.
The Palm Computing Division of U.S. Robotics
800/881-7256
Street price: $299
Reader service no. 714

Apple MessagePad 130

Easy to use; backlit screen.
Apple Computer
800/776-2333
Street price: $799
Reader service no. 715

Zaurus ZR-5800

Full-featured; many connectivity options.
Sharp Electronics Corp.
800/237-4277
Street price: ZR-5800 $649; ZR-5800FX $749
Reader service no. 716



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HP's ScanJet 4p Scans Large and Small Color Jobs Easily

The new ScanJet 4p from Hewlett-Packard won't win any awards for breakthrough technology, but it may win the hearts of mainstream users who want a reliable yet low-cost flatbed color scanner for common office tasks.

With the ScanJet 4p, you can scan images in 24-bit color, gray scale, and black and white, or use the bundled optical character recognition software to convert scanned text into editable text. Rated as a true 300-dots-per-inch scanner, the product can also scan images up to 1200 dpi using interpolation, a software technique that inserts additional pixels to simulate a higher resolution.

The ScanJet 4p provides a much-needed alternative to HP's higher-end ScanJet 4c, a 30-bit, 600-dpi flatbed scanner that costs about twice as much as the ScanJet 4p ($995 versus $499). For the average business user who occasionally wants to include a color photo in a color document, presentation, screen show, or company World Wide Web site, the ScanJet 4p's color quality can fit the bill.

Like its higher-end cousin, the new ScanJet 4p comes with an array of 16-bit software that runs under Windows 95. HP bundled a TWAIN-compatible scanning module; an image editing program (Corel Photo-Paint 5 Select); an OCR program (OmniPage Lite); a copy utility; and Visioneer PaperPort 3.0, a well-designed document management program that serves as home base.

Setting up the ScanJet 4p for a test drive couldn't have been easier. After I installed the bundled SCSI add-in card and software, the unit automatically configured the proper I/O port addresses, provided simple calibration tools, and had me happily scanning within minutes. Most notable is HP PictureScan, the ScanJet 4p's easy-to-use scanning module, which does an exemplary job of guiding casual users through its various options, such as matching the scanning resolution to fit the output resolution.

HP'S LOW-PRICE SCANJET 4P has a quick and simple setup.

If you scan intermittently or in small batches, you may want to opt for a bargain-basement sheet-fed scanner. But with the flatbed ScanJet 4p, you can scan a wider range of materials, including color photos, books, and posters.

—Richard Jantz

HP ScanJet 4p

Easy 24-bit color scanning and OCR.
Hewlett-Packard
800/722-6538, 208/395-2551
Street price: $499
Reader service no. 717

Lexmark's Compact 6-ppm Laser

It's difficult not to be impressed with Lexmark's new desktop personal laser printer, the Optra E. It not only provides true 600-dpi resolution and 6-pages-per-minute speed, but it's well priced and about the size of a toaster oven.

At $549, the Optra E is less expensive than the comparable HP LaserJet 5p laser printer ($899). And the Optra E occupies just a corner of your desktop—its streamlined package is 13.7 inches wide by 9.7 inches deep by 8.6 inches tall. After my informal testing with a shipping unit, I'd keep this quiet, functional printer on my desk at work or home office.

The Optra E offers 1MB of memory and PCL 5e emulation and uses Lexmark's RAM-smart technology to increase print speed. If you're used to working with a 4-ppm laser printer with 512K of RAM, the Optra E will seem fast—it did to me. I found no problems with text quality at 300 or 600 dpi, or printing black-and-white images at 600 dpi.

If you work with mammoth desktop publishing files, you will probably want to add memory; the printer maxes out at 5MB. You can also choose a $739 Optra E model with 1MB of flash memory that stores forms, fonts, and images in the printer to speed up throughput.

As for paper handling, the Optra E prints on nonstandard papers like index cards and heavy stock and comes with 150-sheet input and 100-sheet output trays. (The trays easily snap in and out from the front of the printer and don't take much space when extended.) Lexmark offers a 250-sheet tray for $199, an important option not always available in bargain-price laser printers.

Overall, Lexmark has designed a sturdy, small, and fast printer at a good price.

—Laurianne McLaughlin

Optra E

Space-saving 600-dpi laser printer.
Lexmark Int'l Inc.
800/891-0331
http://www.lexmark.com
Street price: $549
Reader service no. 718

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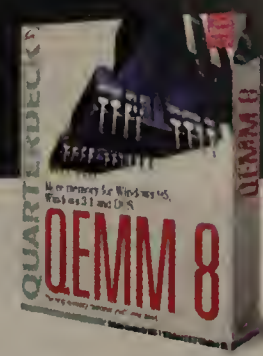

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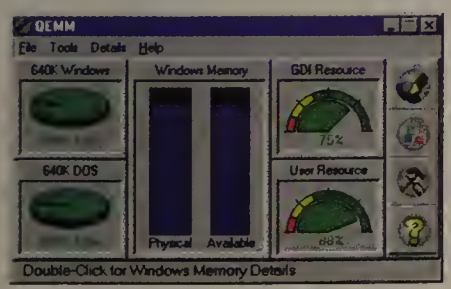
Quarterdeck's QEMM 8 breaks through barriers to squeeze every last byte of memory out of your computer. With a program that's generations ahead in technology, safety and ease of use. And comprehensive enough to let you run all the applications you need, from 32-bit Windows 95 all the way back to DOS.

QEMM 8 uses three key technologies:

QEMM's memory multiplying technology is a proprietary method that compresses physical memory. This, combined with a unique technique to speed up virtual memory gives you maximum available Windows memory. So you don't need to fork out hundreds of dollars for expensive RAM chips.



Just point and click to optimize your PC.

QEMM's resource manager frees up Windows 3.1 User and GDI resources. So you can open more programs simultaneously without those dreaded 'Out Of Memory' messages.

QEMM's system memory management squeezes up to 634K out of the 640K, with patented Stealth technology that maps system ROM into other areas of memory. This doesn't just make your programs and games under the DOS prompt scream right off your screen, it gets Windows the memory it needs.

Manifest gives you a 'view under the hood' of your PC.

No other memory program does so much.

Or does it so well. All this power comes to you in a package that's incredibly easy to set up, optimizes your PC automatically and lets power users fine-tune the settings.

QEMM 8 also comes with Manifest®, so you can see what's happening with your memory and other system components like PCMCIA adapters.

Not that you'll ever have anything to worry about. Over 10 years of experience in memory management makes QEMM 8 one of the most dependable programs.

You couldn't do more for your computer than visit your local dealer today. For more information, go to www.quarterdeck.com or call 1-800-683-6696.

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Multimedia Development Tools Move Toward the Mainstream

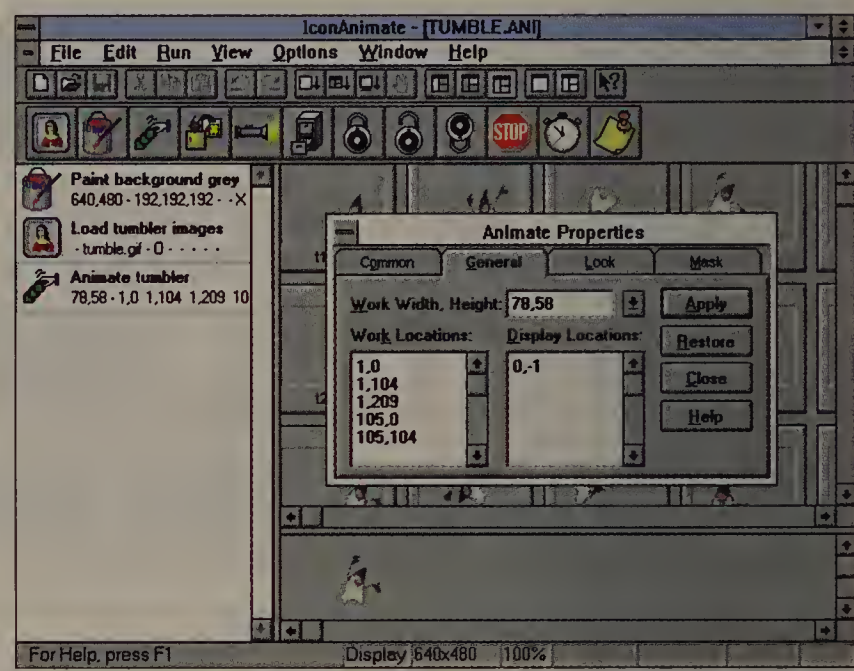
Developing PC-based multimedia applications has long been regarded as a complex, messy chore best left to seasoned software developers familiar with the intricacies of programming languages. But that's changing, thanks to the latest development tools from Aimtech and Macromedia.

Aimtech's IconAuthor SE and Macromedia's Director 5.0 are Windows-based programs that allow you to create sophisticated multimedia applications incorporating text, graphics, animation, audio, and video.

Internet Intensive

IconAuthor is designed specifically for creating multimedia-enabled Internet applications that you can store on Web servers or file servers. Your applications can incorporate audio and video clips to pitch your company's products, for example. According to Aimtech, you can also develop applets that enliven your Web pages with short animations and drop-down and pop-up menus. This version includes a variety of enhancements, such as a new spelling checker—which is useful for making sure your Web pages don't contain any embarrassing typos. More innovative is the new Universal Media Access feature, which lets you store an IconAuthor applet's content files (for example, a video clip) across multiple locations, such as on your server's hard drive or CD-ROM, or remotely, such as on an FTP site.

Aimtech says IconAuthor SE, which is compatible with Netscape's browser software and Web server, is designed for nonprogrammers. IconAuthor's graphical environment uses a flowchartlike interface that lets you drag and drop icons to build an application. It runs on Windows 3.*x* and 95, with support for Windows NT expected shortly. Its list price of $1295 isn't prohibitive, especially if you're serious about creating lively Internet applets. If you require database support as well as cross-platform capabilities, IconAuthor version 7.0, at a list price of $4995, would be a more suitable option.



ICONAUTHOR'S ICONANIMATE TOOL features clever icons that help nonprogrammers create multimedia applications.

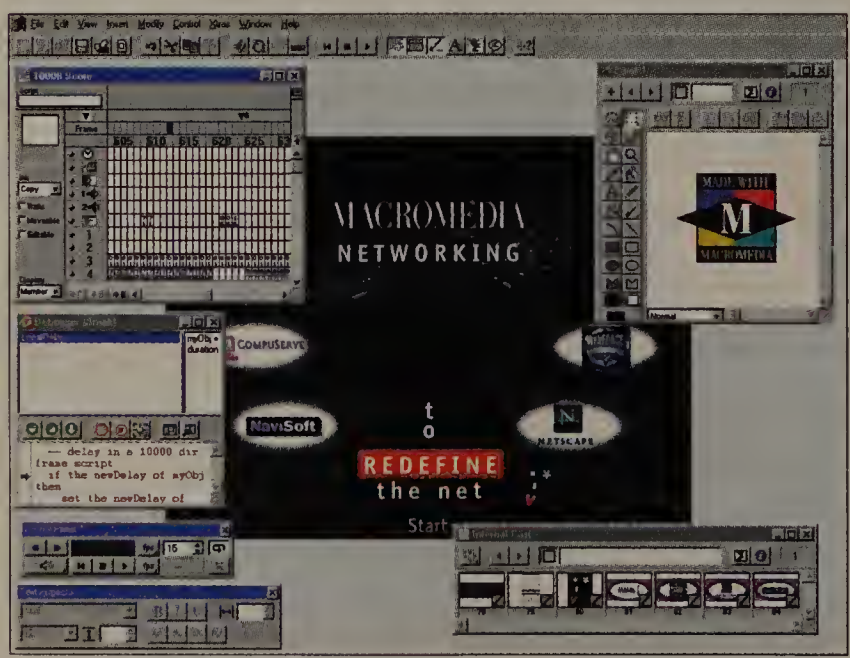
Programmer's Delight

Macromedia's Director has long been praised for its set of powerful software authoring tools, and critiqued for an unfriendly interface that forces users to master arcane programming commands. Despite its shortcomings, Director remains popular among multimedia developers for projects such as kiosk interfaces and interactive CD-ROMs.

Version 5.0 includes enhancements such as an improved interface with shortcut menus you open by right-clicking the mouse. It also supports the popular Rich Text Format, allowing you to import RTF documents from common word processors such as Microsoft Word. Unfortunately, Director is still a command-line–driven product that's really not suited to laypeople.

If you're developing a Web site, Macromedia's new Shockwave for Director add-on utility lets you create interactive Web pages with multimedia features. Director 5.0 runs on several platforms—Windows 3.1, 95, and NT, plus the Macintosh and Power Macintosh—and is street-priced at $850. The upgrade is $399.

—Jeff Bertolucci



MACROMEDIA DIRECTOR is popular, versatile, and cheap, but its arcane command-line interface is still a drawback.

IconAuthor SE

Ideal tool for interactive Internet-based applications.
Aimtech Corp.
800/289-2884
List price: $1295, version 7.0 $4995
Reader service no. 679

Director 5.0

Useful tool for a variety of multimedia projects.
Macromedia
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INFOWORLD, JAN 96

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PC MAGAZINE, JAN 96

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JERRY POURNELLE, BYTE, NOV 95

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JIM RAPOZA, PC WEEK, NOV 95

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Weak OCR Undermines Otherwise Capable FormReader

Even as we move toward a paperless society, with electronic tax filing and other online transactions, we can't entirely escape our paperwork. But form-reading software can take the shuffle out of your workday by moving forms onto your computer, where filling them out becomes a streamlined process.

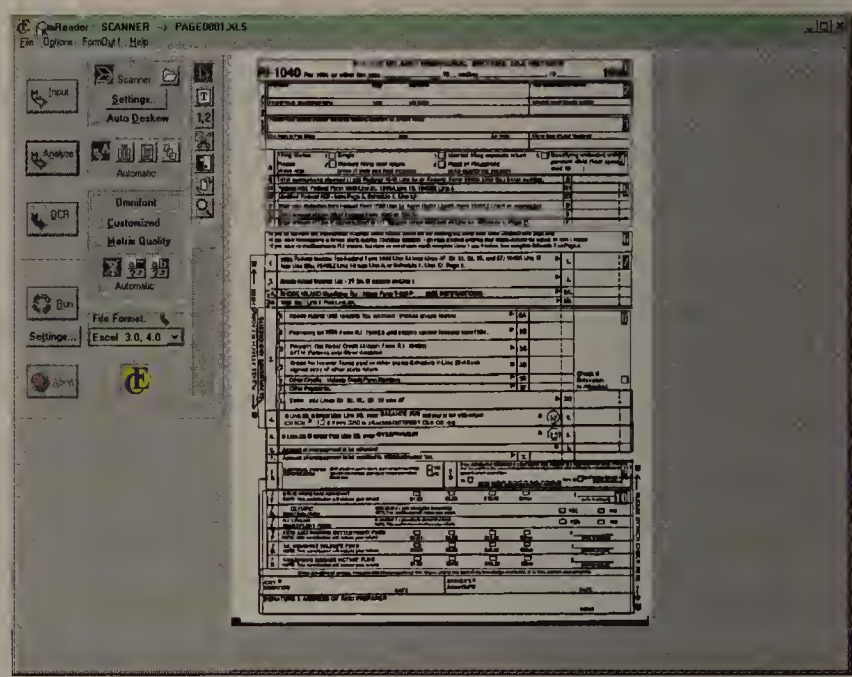
Ligature's FormReader combines optical character recognition software (CharacterEyes Pro) with form-recognition technology (FormOut). The FormOut component converts areas on a scanned form into data fields by determining which fields are fixed and which are supposed to be filled; CharacterEyes Pro converts the information into machine-readable data.

How effective is it? I used a shipping version of FormReader with a Logitech PageScan color scanner and found the OCR less than satisfactory. A few mistakes in a word-processing document is no big deal, but if you're pumping forms through a scanner and into a database or spreadsheet application, you want 100 percent accuracy. I didn't see it here. There were at least six errors on one page I scanned, which I find unacceptable.

FormReader is a 16-bit application, but I had no problems running it under Windows 95. However, the user interface isn't as slick as Caere's OmniForm 2.0.

At a list price of nearly $2000, FormReader calls for a hefty investment by its target market—small office/home office users (OmniForm costs only $199). For users with low volumes of forms, the capital outlay won't be justified. And for medium-volume users, catching up with the misread input may be more work than keying in the data manually.

—John P. Mello Jr.



MISTAKEN IDENTITY: FormReader's optical character recognition makes lots of errors when translating forms like this one.

FormReader

A pricey way to digitize forms.
Ligature Ltd.
617/238-6734
List price: $1995
Reader service no. 681

Reach Out and Grab Something

Whether you're designing a simple sales brochure or publishing a software training manual for new employees, a screen capture utility is essential. Using <Prt Sc> to dump bit maps to the Clipboard is time-consuming and has few options: You can't pick specific areas, set time delays, or number your screen captures sequentially. We looked at shipping versions of two new programs, Ulead PhotoImpact 3.0 and SnagIt/32, that make the task much easier.

It's not enough to call PhotoImpact 3.0 a screen capture program. Its capture utility is but one part of a larger—and expensive ($199)—image-editing package, a redefined version of ImagePals that runs under Windows 95 and Windows NT 3.51. Its image-editing tools are comparable to those in stand-alone editing packages such as Paint Shop Pro. Besides its editing component, PhotoImpact also has an organizing advantage: It lets you catalog your images as thumbnails.

If you don't need an image editor, then consider TechSmith's $39.95 SnagIt/32, which includes 16- and 32-bit Windows versions in the same package. SnagIt/32 has many of the screen capture features that PhotoImpact does, including timers for delayed captures and multiformat file saves.

While PhotoImpact can send a capture to different destinations simultaneously, SnagIt/32 uses a single destination. It can also send an image as an e-mail attachment if you're using a 32-bit MAPI client (as long as the e-mail program is open).

Even if your image needs are simple, a good screen grabber is an essential Windows tool.

Ulead PhotoImpact 3.0

Controlled screen captures backed by full suite of image-editing tools.
Ulead Systems
800/858-5323
List price: $199
Reader service no. 682

SnagIt/32

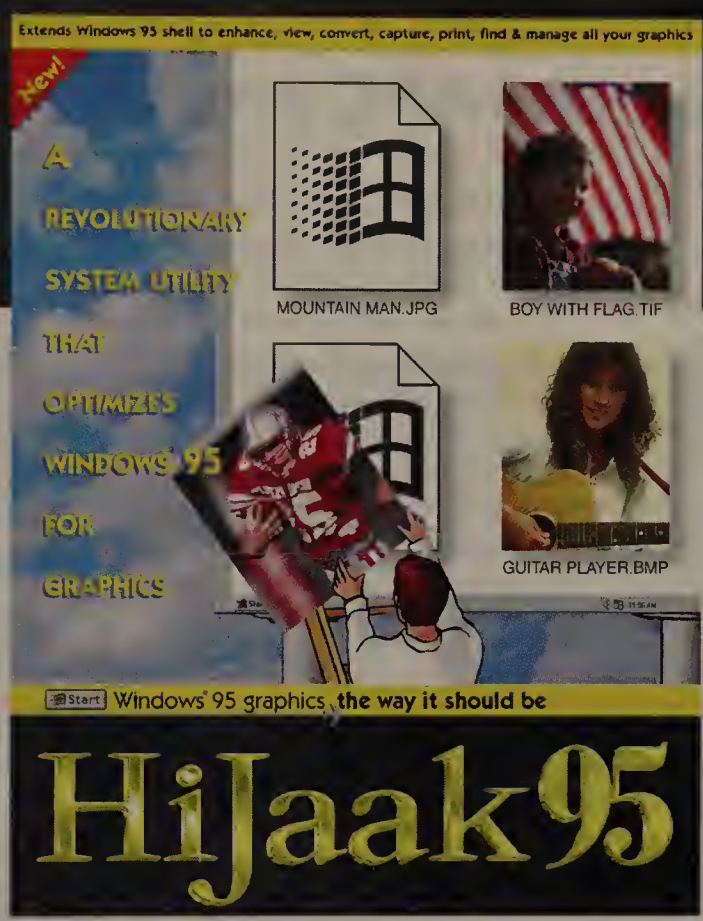
Quick and controlled screen captures, even as e-mail attachments.
TechSmith Corp.
800/517-3001
List price: $39.95
Reader service no. 683

For sophisticated jobs, PhotoImpact is the right choice, but you pay for the impressive editing tools. For simple but controlled image captures, SnagIt/32 works just fine.

—Peter Scisco

REVOLUTIONARY

System Utility to Optimize Windows 95 for Graphics!



NEW! for Windows 95

Windows 95 Graphics the way it should be

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HiJaak 95 makes you more productive with graphics by revolutionizing the way you work with graphics in Windows 95.

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HiJaak95 the way it should be

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Circle 189 on reader service card

New Back-UPS® Pro™ PnP
itself the first time you use

Experts agree: Windows 95 and Windows NT Workstation demand APC protection

If you're using a computer, few things are more certain than power problems. If you haven't yet had a blackout, lost a hard drive, or toasted a modem, you will. It's almost a statistical certainty.

No surprise that *PCWeek* showed power problems such as blackouts, brownouts, and surges accounted for almost as much data loss as all other factors combined, or that a leading accounting firm attributed the largest single cause of computer downtime to—you guessed it—bad power.

Multi-tasking multiplies your risk of *"The Big One"*

Multi-tasking operating systems like Windows 95 and Windows NT Workstation let you open and manipulate multiple files and applications at the same time. That's why, unfortunately, as *PC Magazine* says "When Windows 95 does crash, it's a horrible mess..."

Moreover, if you are "wired" to the Internet, an on-line service, or dialing into the office, you'll discover that phone lines are common paths for surges taking the express route direct to your motherboard.

LIFETIME EQUIPMENT PROTECTION

$25,000

FOR AS LONG AS YOU OWN THIS PRODUCT, IF YOUR PROPERLY CONNECTED EQUIPMENT IS EVER DAMAGED BY AN AC SURGE, INCLUDING SURGES DUE TO LIGHTNING, APC WILL REPAIR OR REPLACE OUR PRODUCT AND UPTO $25,000 OF CONNECTED EQUIPMENT (SEE POLICY FOR DETAILS, VALID IN U.S. AND CANADA ONLY).

In short, if you still don't have proper protection (that $5 surge strip doesn't count) it's time to protect yourself before you kick yourself. Experts agree: If you choose not to decide on proper protection now, the next time you see this ad may be too late.

ROI in the blink of an eye

More than 4,000,000 smart computer users protect against the inevitable with the affordable: award-winning power protection from APC, including the UPS that's winning praise the world over: the Plug n Play Back-UPS Pro. Ask them and they'll tell you: One prevented problem is all it takes to pay for proper power protection many times over.

Back-UPS Pro PnP UPSs feature:

- Instantaneous battery backup protects your data against a total loss of power.
- Automatic Voltage Regulation (AVR) provides the edge you need for full protection against extended brownouts or overvoltages without draining the battery.
- CellGuard™ intelligent battery management dramatically extends battery life with fast recharge and deep discharge protection. Battery diagnostics warn you before problems occur and batteries are quickly and safely user-replaceable without needing to shut your system down. (Batteries last 3-6 years under normal use).
- $25,000 lifetime repair/replace guarantee against surge damage to your equipment (see details).
- Built-in phone line/10Base-T network cable surge protection for a bulletproof response to anything Mother Nature or Murphy's Law sends in your direction.

So don't wait for the school of high shocks to teach you an expensive lesson. Ask for APC today.

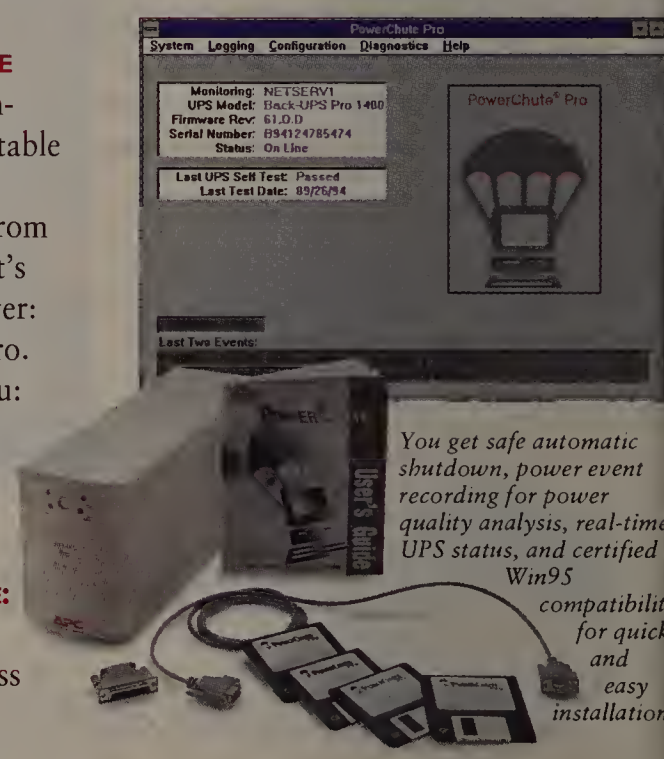
More than 4,000,000 satisfied users say "Protect me! with APC"

CLOCKWISE: " I'm an electrical engineer, and understand what's needed to protect a Pentium-class machine. I recommend these to everyone I know," says Jim Rawnick. "I especially like the Back-UPS Pro because it compensates for voltage irregularity without kicking over to battery."

"We've had great experience with APC," says Gordon Zellers. "The Back-UPS Pro has great features: it tells you if the battery is getting low, and they're user-replaceable with no hassle. As a small business, our computers and phones are vital to us. So is APC protection..."

"As a Fortune 500 company, we've used APC for at least 6 years," says Matt Lazar of Phelps-Dodge subsidiary Columbian Chemicals Co. "The new Back-UPS Pro PnP is easier to use than ever and is now our preferred UPS for our corporate PC's."

FREE software!



You get safe automatic shutdown, power event recording for power quality analysis, real-time UPS status, and certified Win95 compatibility for quick and easy installation

Currently supports Windows, Windows 95, Windows NT, Windows for Workgroups and OS/2.

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WINDOWS MAGAZINE

"APC'S BACK-UPS PRO SAVED THE DAY JUST AS EXPECTED."
WINDOWS SOURCES

"99 OUT OF 100"
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PC World 20 Best Upgrades

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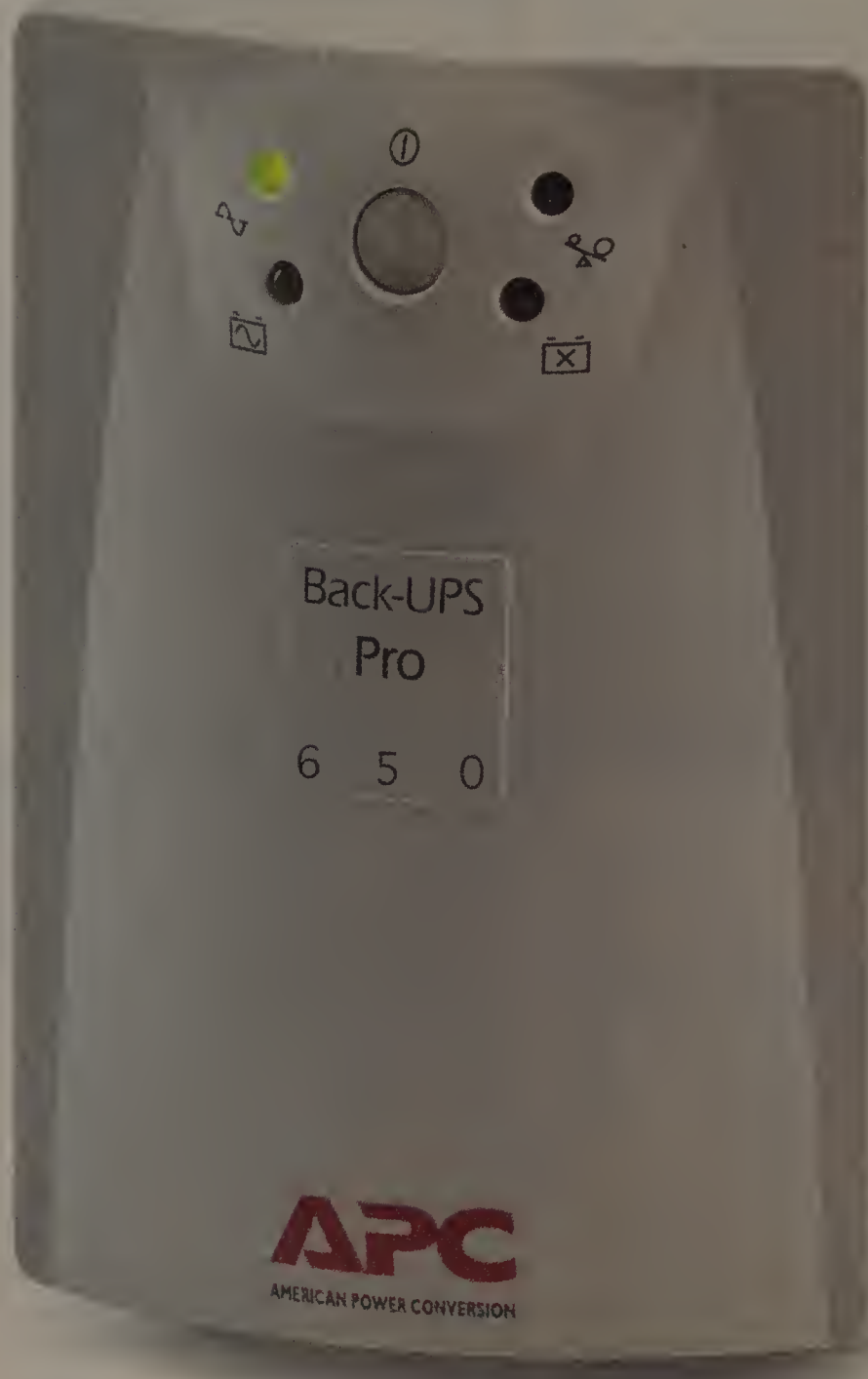
WINDOWS MAGAZINE Reader's Choice



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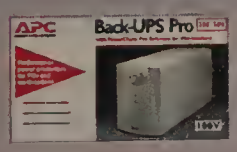
For **advanced PC protection** including automatic voltage-regulation, CellGuard battery management and phone line/10Base-T protection, choose the Back-UPS Pro. For longer runtime choose a higher VA rating. For **basic PC protection** choose from the Back-UPS® family (software not included). For **file-server protection**, ask for our Smart-UPS® line (not shown). For hardware-only **surge protection**, ask for APC's SurgeArrest™ line (not shown).



Back-UPS PRO

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FOR PENTIUM, 486, WIN 95, AND BUSINESS APPLICATIONS

Volt-Amp Rating		List Price	Runtime*
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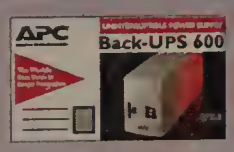
650PNP	(Includes software)	$419	17 min
1000	(software not included)	$589	35 min
1400	(software not included)	$759	74 min

*Runtime shown is for typical Pentium desktop system and may vary with your actual load. Note: Back-UPS 200 not recommended for Pentium systems



Back-UPS

BASIC PC PROTECTION:
FOR 286, 386, ENTERTAINMENT, AND EDUCATION

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600	(software not included)	$359	31 min
900	(software not included)	$529	47 min
1250	(software not included)	$689	75 min

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Circle 45 on reader service card

Where's My Staff? New Software Tells All

How many times have you trekked to a coworker's office, only to find an empty chair? Although in/out boards are supposed to eliminate this situation, they are useless in offices with staff spread across several floors or buildings.

We've found a product that addresses this problem: Teamaker's Office Hours for Windows. The program runs on a network and provides an easy way to track the whereabouts of other employees.

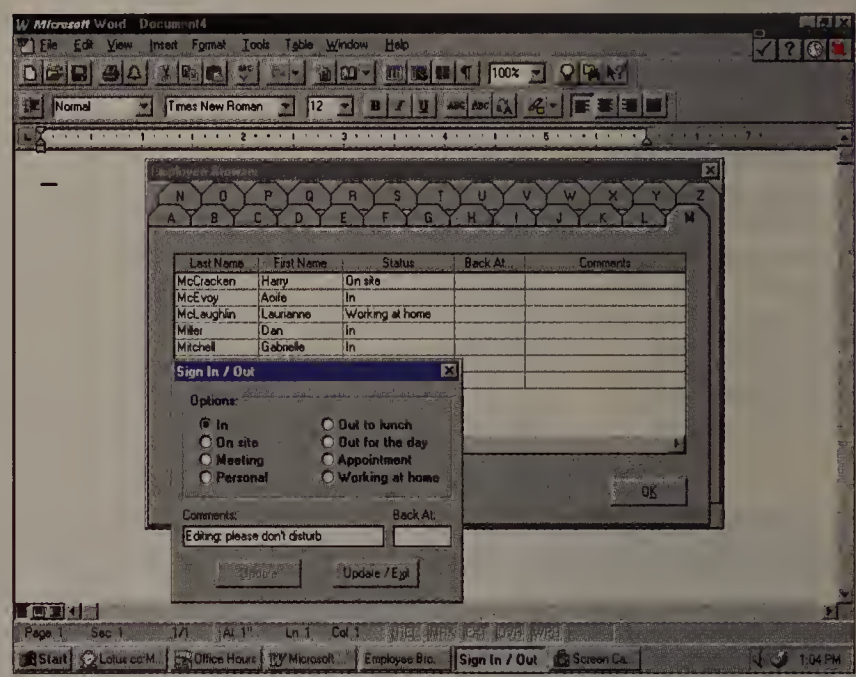
We examined a shipping copy for this article. Office Hours consists of four modules: an in/out board, an employee browser, an events calendar, and a time card. The concept is simple. Just one click on the in/out board, and the software notifies people of your whereabouts. The browser lets you check on an individual's status. A second screen in the browser module shows people's phone information, such as extensions and pager numbers.

Overall, the product was easy enough to use, but we have a few caveats. Because Office Hours for Windows is essentially a networked database, it requires that all users have read and write privileges to the directory where the program is stored so that they can enter their whereabouts. This is important only if such network privileges pose a security problem at your organization.

Other small complaints: Like an in/out board that hangs on the wall, the product is useless if people forget to update their whereabouts. Also, the program works only with Windows 3.*x* and Win 95; employees on other operating systems such as the Macintosh are left out.

Nevertheless, Office Hours should be useful, especially for people who field calls for large groups. The program comes in 50-user packs for $149.95.

—Gabrielle Mitchell



UPDATING YOUR WHEREABOUTS or locating other employees is a snap with Office Hours for Windows.

Office Hours for Windows

Electronic in/out board.
Teamaker Corp.
503/520-5050
List price: $149.95 for 50 users
Reader service no. 684

Salsa's Object Catalogs Spice Up Database Design

Salsa for the Desktop steps to its own beat in the world of Windows database programs, simplifying the design process in a way not found in other relational databases.

The beta version I used was full of colorful welcoming graphics. The opening screen, "Learning Studio," had several options for getting started. The Big Picture gives an overview of Salsa, the Interviewer guides you through setting up a database, and the Idea Book provides a collection of tips. I opted for the Tour Bus (reminiscent of Microsoft's learning series, Scholastic's Magic School Bus), which automates the database setup for you.

Salsa uses a drag-and-drop object metaphor to create databases. You select customizable objects that represent customers and orders from a catalog of templates that include data items like Name and Address. And, instead of setting up a separate file for line items, you create "data groups" for details that can repeat in an order, such as product, price, and quantity.

This program, which runs on Windows 3.1, 95, and NT, will likely work well for anyone needing to set up a simple database for personal use or even a small workgroup. Although Salsa is also designed for data sharing, I wasn't able to test that capability.

Salsa comes with Starter Kits, which are catalogs of objects, data items, and data groups for General Business, Customers and Contacts, and Lists and Labels. Additional Starter Kits for projects such as Time and Billing, Personal Investments, and Sales Management are also available. While I found it fun and easy to set up a new database, the project became a chore when I attempted tasks like adding pick lists to a form or making a field show a calculated value. Salsa keeps its word about simplifying database setup, but I can't say it's dramatically easier to use than Approach or FileMaker Pro, since these programs come with ready-to-use applications that also shield users from the mechanics of database design.

—Celeste Robinson

Salsa for the Desktop

Friendly database with helpful design tools.
Wall Data Inc. Salsa Products
800/777-2572
List price: $499, introductory price $149, Starter Kits $49 each
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The ProClass™ 288 PC Card modem features transmission speeds up to 230,400 bps, and EZ-Port™ (the convenient pop-out telephone connector). It uses 90% less battery power than other modems, is easily upgradeable, and has calling card and distinctive ring detection. The ProClass PC Card is backed by 7 day technical support and a five year limited warranty. What a value! For more information, call us at 800-934-2937, ext. 220 or use PRACTIFAX at 800-225-4774 and select document 3060.

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Circle 191 on reader service card

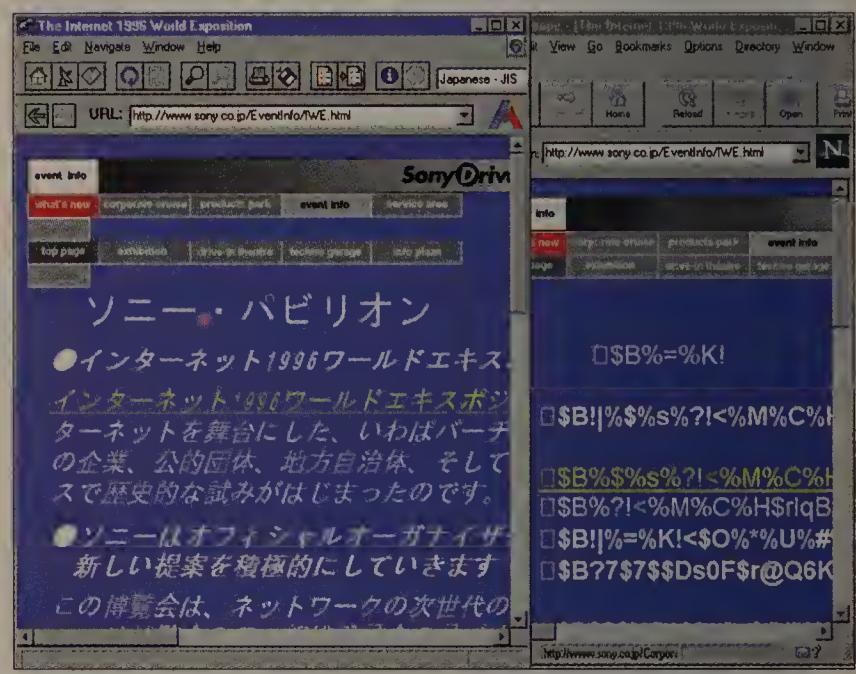
Accent Brings the World to the Web

The advent of e-mail and the growth of the Internet may eventually make the global village a reality, but right now the village seems more like the Tower of Babel. English is the de facto language on the Net, but millions of users (and potential users) don't speak this lingua franca, and the most popular Web browsers are of little help. Russian, Greek, Japanese, Arabic, and Hebrew are just a few languages of the growing electronic village.

Internet With an Accent, a multilingual Web viewer and publisher, solves that problem. I examined a shipping version of this four-in-one package. It includes a multilingual Web browser (a modified version of Mosaic called Multilingual Mosaic) that "debabelizes" Web sites so the words you see on screen are in the characters and language that the site was written in; a multilingual publisher that lets you write Web pages in foreign languages, a viewer that displays multilingual documents created with Accent's word processor (Accent 2, a separate product that allows you to read Web pages and e-mail), and the MailPad, which lets you read and write e-mail messages in one of the supported languages.

Internet With an Accent supports more than 30 languages, so when you get to a foreign-language Web page, just select the appropriate language and character sets from a drop-down menu in the toolbar, and say *do svidaniya* to your multilingual browsing headaches. Accent has a Netscape plug-in, too, that can be downloaded free from Accent's Web site. But if you have to publish multilingual Web pages or correspond in a foreign language, you'll need to purchase Internet With an Accent.

—Yael Li-Ron



A WEB PAGE OF KANJI CHARACTERS arises from total gibberish if you view it with Internet With an Accent's browser.

Internet With an Accent

Multilingual viewer and publisher for the Internet.
Accent Software Int'l
800/535-5256
http://www.accentsoft.com
Street price: $89
Reader service no. 686

Survey Software Automates Electronic Polling

Survey fever has hit the United States, and a new product called Decisive Survey brings polling to the electronic frontier.

Companies that rely on feedback from employees, customers, or potential customers will find Decisive Technology's software useful. I examined a shipping version of Decisive Survey, which lets you create electronic surveys, distribute them via a local area network, e-mail, or the Internet, then collect and automatically collate the responses.

The program is easy to use, especially for beginning pollsters. You can create your own survey from one of the included sample surveys (there are more than a dozen) and stock questions. Decisive Survey's documentation contains a good primer on conducting a successful survey. The on-screen help includes informative animations and graphics.

Decisive Survey sends out simple text format files only. It works best with a MAPI-compliant system such as cc:Mail or Microsoft Mail, but it will import from other systems. More important, though, is Decisive's ability to gather surveys over the Internet.

On the back end of the process, Decisive Survey automates data entry by charting results as the surveys are returned. The software also calculates statistics such as mean, median variance, and standard deviation. The results can be exported to other applications. Additionally, you can set up the software to create a list of open-ended questions or qualitative responses.

Decisive Survey can also create cross-tabulations to identify the correlation between respondents and questions, and create filters that view a segment of responses. For example, if you wanted responses only from unmarried employees, you could set the parameters and the software would sort the data for you.

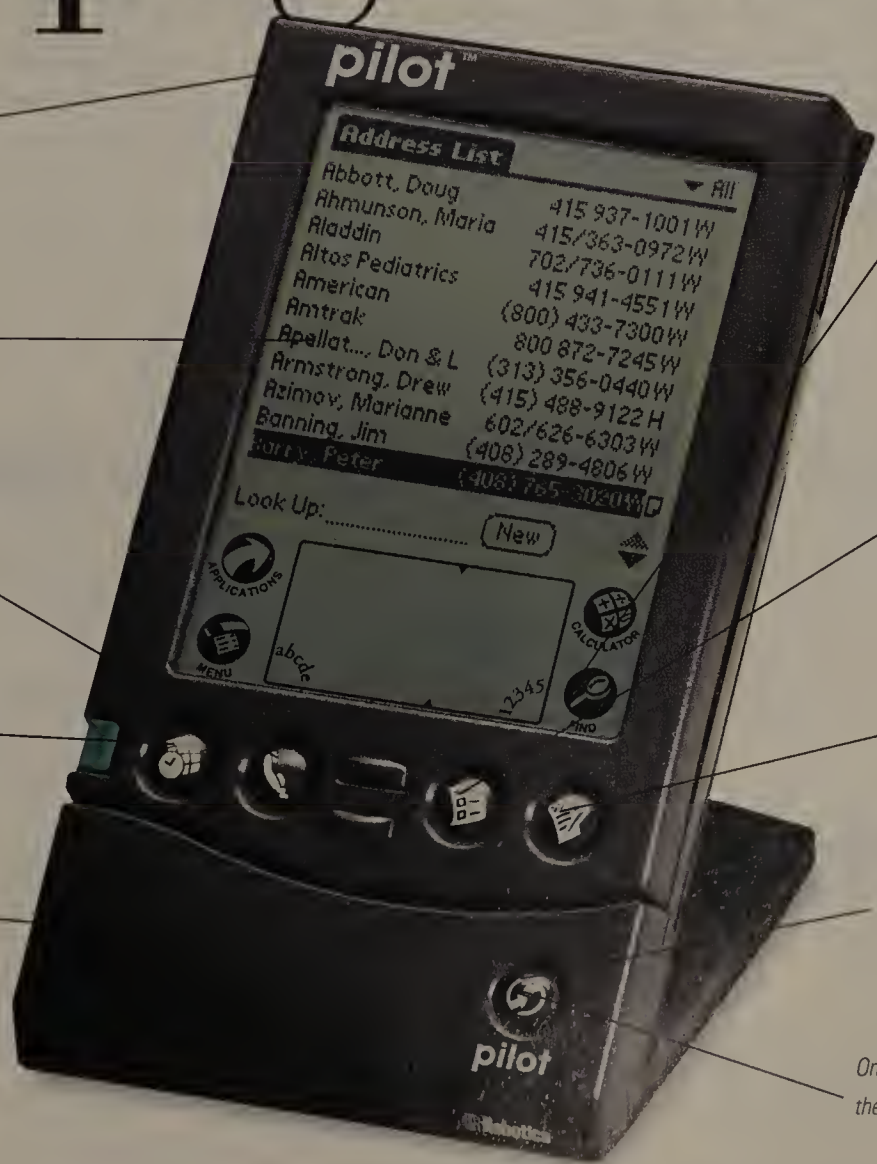
Getting a profile of your customers or staff can be invaluable. Decisive Survey takes the hassle out of survey-taking and analysis.

—John P. Mello Jr.

Decisive Survey

Polling software for cyberspace.
Decisive Technology
415/528-4300
http://www.decisive.com
List Price: $495 (surveys 100 people), $995 (surveys 1000 people)
Reader service no. 687

It does more. But this is a one page ad.



Pilot™ is your automatic link to the personal info on your PC.

Pilot includes its own Personal Information Manager software that lets you edit, import and export info to and from your PC.

Pilot stores thousands of addresses, phone and fax numbers, personal notes — you name it.

Touch here to see the day's agenda. Make recurring meetings appear automatically.

Pilot's PIM works with desktop PIMs like Sidekick, Schedule+, Now Up-to-Date and others.

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Prepare a To-Do list, prioritizing items by due date. Make items disappear as you complete them.

Take notes on the road, then later drag and drop them into programs like Word or Excel on your PC.

Enter data once into your Pilot or PC. Then press the HotSync™ button to keep your Pilot and PC up-to-date.

One touch automatically keeps the data on your Pilot safe and backed up on your PC.

At about 4.5" tall, 5.5 oz. and at $299,* the new Pilot organizer fits your shirt pocket—and your budget. Yet it's huge on functionality. But instead of telling you all it can do, we think you'd rather try it out yourself. To find out where to get your hands on one, give us a call at 1-800-881-7256. To arrange a demo, visit our web site at http://www.usr.com/palm.

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The one touch organizer

U.S. Robotics
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*The average U.S. street price for PILOT, complete with all desktop PIM software and organizer software, docking cradle and accessories. © 1996 U.S. Robotics, Inc. U.S. Robotics and the U.S. Robotics logo are registered trademarks and Pilot and HotSync are trademarks of U.S. Robotics, Inc. and its subsidiaries. All other product names are registered trademarks or trademarks of their respective owners.

Circle 173 on reader service card

Take a Virtual Trip to the Tropics

Launch Sabre Interactive's Virtually There: Caribbean, and you enter a 3-D "travel mall." This CD-ROM is certainly entertaining: In the mall's "Movie Complex," you can watch six slick videos depicting appetite-whetting Caribbean island scenes. But the disc's dazzle doesn't make up for its lack of details.

On a technical level, Virtually There: Caribbean takes the travel CD-ROM genre in new and useful directions. Along with its snazzy multimedia, the program incorporates a direct link to Prodigy's easySabre reservation system, so you can click to dial into Prodigy and book air, hotel, and rental car reservations. It's convenient, but only Prodigy members can take advantage of it.

The disc's "Travel Shop" brings you to an interactive activities map, useful for getting an overview of what's available. You can click on brochures at the activity desk, too—but they aren't much more than ads for Avis and American Airlines. (Sabre Interactive and American Airlines have the same parent company—AMR Corporation.)

VIRTUALLY THERE: CARIBBEAN whisks you off to the virtual tropics, where you visit travel shops and watch videos.

From the "Great Escape Departure Lounge," you can jet off to an island, enter an animated street scene, and visit a tourist agency. But the information is shockingly shallow. The section on accommodations in the Bahamas, for instance, simply says that you'll find large resorts and small inns. You can't do things like search for hotels by price. Ultimately, the disc just isn't worth $29.95.

—James A. Martin

Virtually There: Caribbean

Technically savvy but superficial travel guide.
Sabre Interactive
817/963-3372
List price: $29.95
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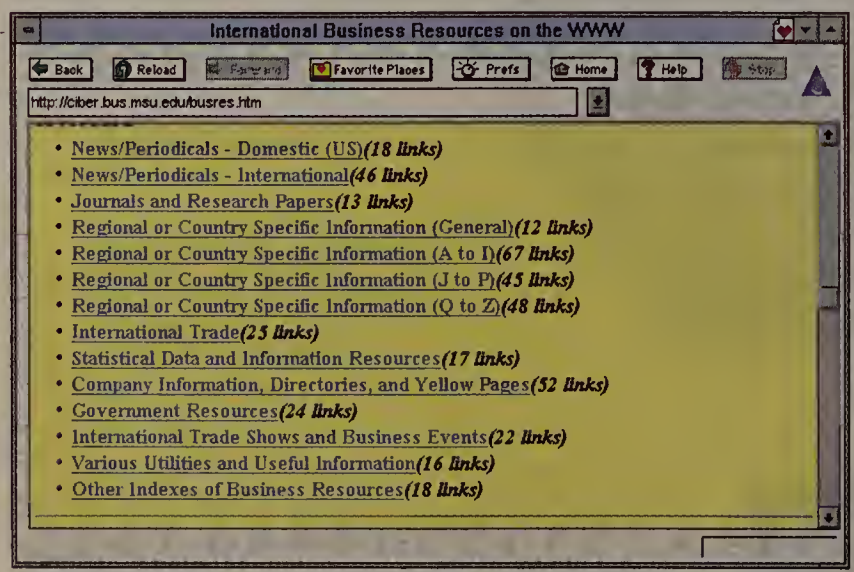
Find a Wealth of International Business Research Data

Thanks to the folks at Michigan State University's Center for International Business Education and Research, you can explore worldwide collections of business data and research from one Internet site. Whether you're investigating a particular region or market for a report or presentation, or considering an expansion overseas, you can find good information and excellent links at the MSU-CIBER site (http://ciber.bus.msu.edu).



THINK GLOBALLY: Find international business research data and tips on foreign markets at the MSU-CIBER site.

The site includes an exporting forum and the Journal of International Marketing. But its best feature is the list of links titled "International Business Resources on the World Wide Web," which points to sites providing everything from economic statistics to tips on doing business in specific countries.

I was able to choose links to government resources, such as the Baltic Business Council and the U.S. Small Business Administration. You'll find sites relating to particular regions and international publications. This is the place to read different examinations of NAFTA. For statistical data, take a quick hop to the U.S. Census Bureau, or to resources with economic estimates from Asia.

MSU-CIBER isn't fancy or exhaustive, but it's a timesaving starting point for research.

—Shane Mooney

MSU-CIBER

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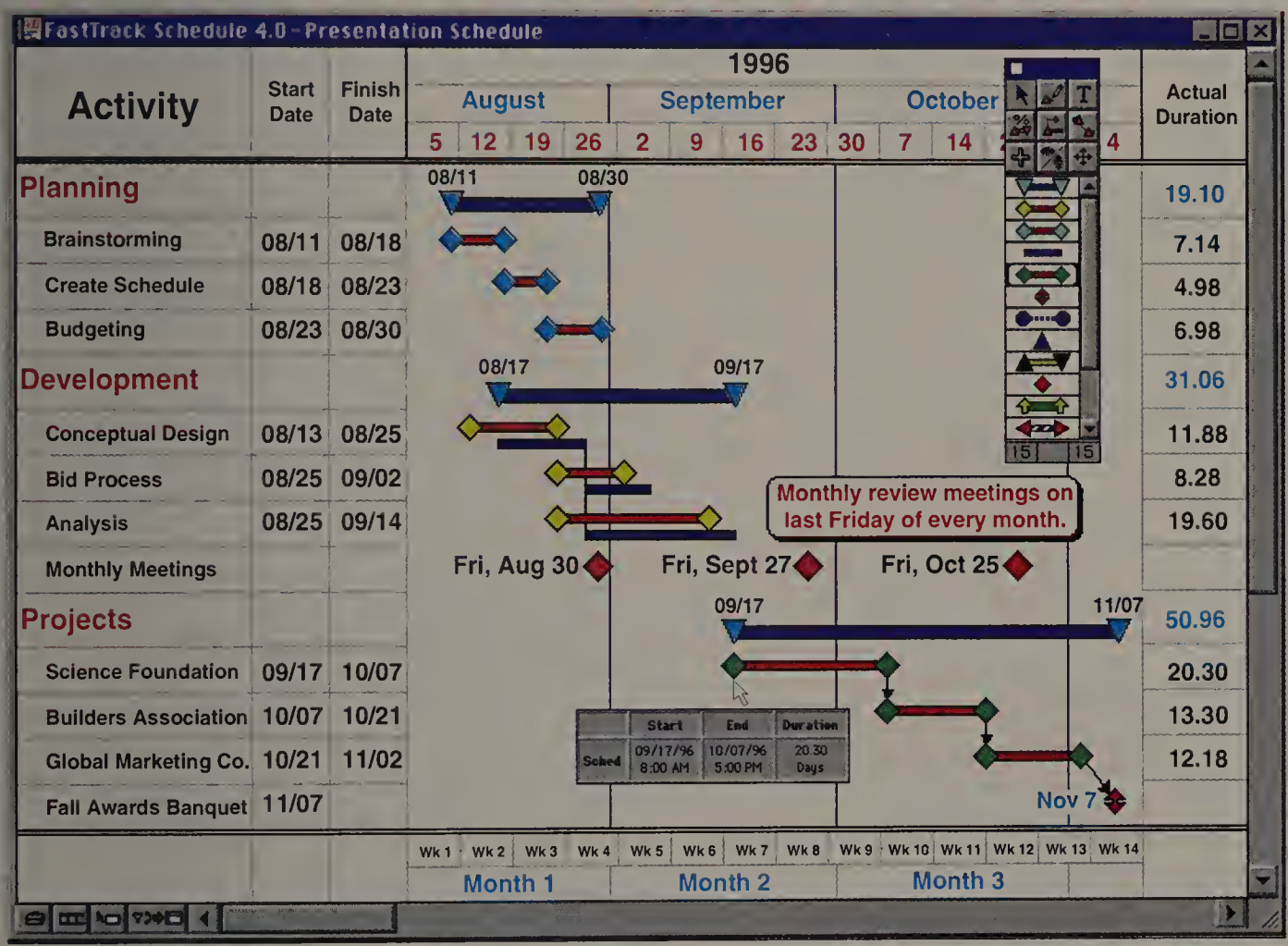

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Designed for Microsoft Windows 95

yes It runs with NetWare

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Windows Magazine

Designed for Microsoft Windows 95

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HP Vectra XU

†In Canada, call 1-800-387-3867. *Average U.S. street price. Monitor not included. **Other capacities available. HP Vectra PCs come with MS-DOS® 6.2 and MS Windows for Workgroups 3.11 or Windows 95 or OS/2 or Windows NT included. [1]First year, on-site, 24-hour, next-day service. Second and third year, return to dealer. MS-DOS is a U.S. registered trademark and Windows and Windows NT are U.S. trademarks of Microsoft Corporation. Pentium and the Intel Inside logo are U.S. registered trademarks of Intel Corporation. OS/2 is a registered trademark of the International Business Machines Corporation. ©1995 Hewlett-Packard Company PPG425

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Exceptional performance and expandability at an affordable price.

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- 1,000MB** Enhanced-IDE hard drive
- PCI Matrox Millenium graphics card with 3D acceleration and 2MB of WRAM, upgradable to 4MB or 8MB
- 7 mass storage shelves (5 front accessible)
- 6 expansion slots: 3 PCI, 1 PCI/ISA combo and 2 ISA
- Integrated 16-bit audio and 4X CD-ROM
- Microsoft Windows NT 3.51 or IBM OS/2 Warp
- Free three-year limited warranty for parts and labor[1]

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HP Vectra VT

Since Compaq and IBM don't get the concept of 'value pricing,'

HP PCs would like to shed some light on the subject.

What it *doesn't* mean: bare-bones PCs with pared-down prices. What it *does* mean: PCs with all the features you need for much less than you'd expect to pay. Five prime examples are highlighted here. Compare their features and prices with the other leading brands, and you'll see why HP is the only one inviting comparison. Our entire line represents the best values in the business PC market. From value-priced Pentium™ processor-based PCs to our blistering hot, dual Pentium Pro processor-based HP Vectra XU PC.

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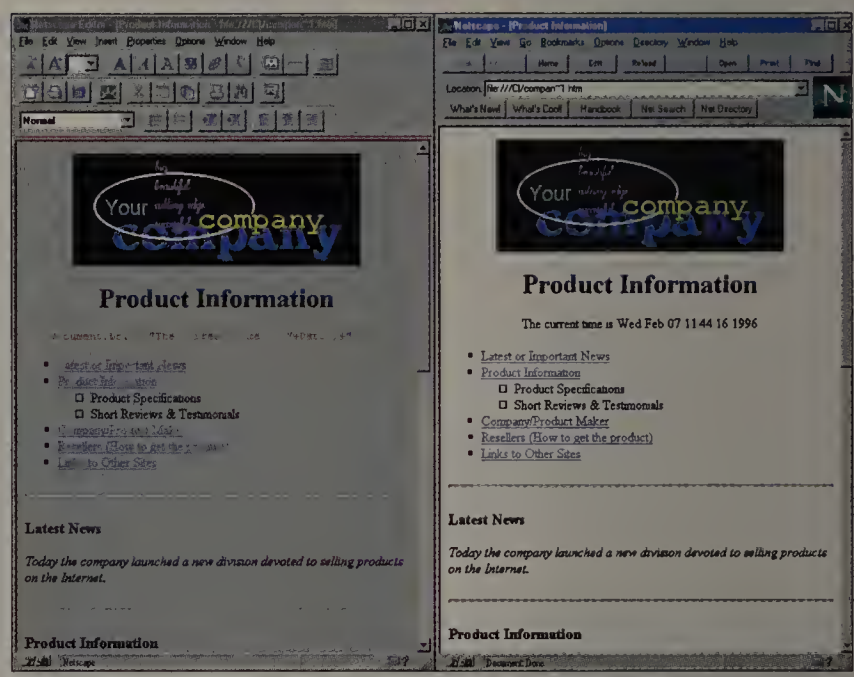
Netscape Navigator Gold: Easier Web Publishing for Newcomers

With many HTML authoring tools, creating a World Wide Web page requires a constant shuffle between an editor, to mark up your text, and a browser, to see the results. Netscape Navigator Gold 2.0, for Windows 95 and NT, eliminates this shuffle. (International Data Group, the parent company of *PC World*, is a minority shareholder in Netscape Communications.) It's a browser—Netscape Navigator 2.0—and HTML editor. A toolbar button lets you toggle between your edits and the view, so you can track your changes. You can also split the screen to view both windows.

You won't need to learn HTML coding. Settings, tags, and formatting options let you insert elements such as headers and links. Navigator Gold also supports drag-and-drop, so you can plop images and links from your browser into the editor. Don't know where to begin? The Page Starter function offers 13 templates and a list of Navigator Gold Internet Service Providers that can put your page on the Web. The "One-button Publish" feature (not ready in the beta copy I saw) will simplify posting to an ISP's server, Netscape says.

But this product lacks some advanced authoring features. There's no tool for tables and frames, or interactive forms such as fill-in fields and choice lists. Netscape touts Navigator Gold as the first JavaScript program editor. (This will let advanced users make their pages more interactive.) Nonetheless, Navigator Gold is best suited to Net newcomers—for whom it's probably the best option.

—Samantha Parent



WEB PAGE PUBLISHING MADE SIMPLER: Netscape Navigator Gold 2.0 lets you browse and edit a Web page from a split-screen view.

Netscape Navigator Gold 2.0

Makes creating and editing Web pages almost as easy as browsing them.
Netscape Communications Corp.
415/528-2555
List price: $79, with 90-day warranty; download from Netscape's Web site
http://www.netscape.com
Reader service no. 648

Remote LAN Access With NetWare Mobile

Wherever you roam, Novell's NetWare Mobile keeps you in touch with your office's local area network. This client software lets you connect to NetWare and other types of networks with a LAN adapter when you're in the office, connect via modem when you're off site, and make copies of important files so you can access them as if you were directly connected to your LAN, even when you're not. NetWare Mobile is designed to run under Windows 3.1 and Windows for Workgroups 3.11. (It will work under Windows 95, but for full 32-bit capabilities, including Plug and Play support, you'll need the 32-bit NetWare Mobile client, due to ship in the second half of 1996, Novell says.)

You could reproduce some of NetWare Mobile's remote network access features with remote control packages like Remote Control from Microcom—but only NetWare Mobile gives you the same interface for all network resources no matter how you connect.

I tested a prerelease version of NetWare Mobile on a Windows 3.1 machine, connecting to a NetWare 4 LAN. You set up different locations, like "home," "office," or "the road" to define the method you'll use to connect. At home, you'd use a modem and NetWare Mobile's PPP (Point-to-Point Protocol) client. When your PC boots, you choose your location, and the software handles the links to NetWare 3.*x* or 4.*x* networks or the Internet.

Performance over a modem is slow, but acceptable for copying small to medium-size files. You can replicate needed LAN files for offline sessions, so they're copied to your PC's hard disk. Point and click, or use wild cards, to copy files or directories.

Even if you haven't copied the files, the network directories look like you are linked. If you need a file that hasn't been copied, the software dials in and retrieves it. When you reconnect to the LAN, NetWare Mobile updates the originals.

Installation is best done by your network administrator.

—Pete Loshin

NetWare Mobile

Easy remote LAN access.
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http://www.novell.com
Pricing: Single-user license, $129; 100-user license, $6995
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SupraExpress™ 288

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Circle 60 on reader service card

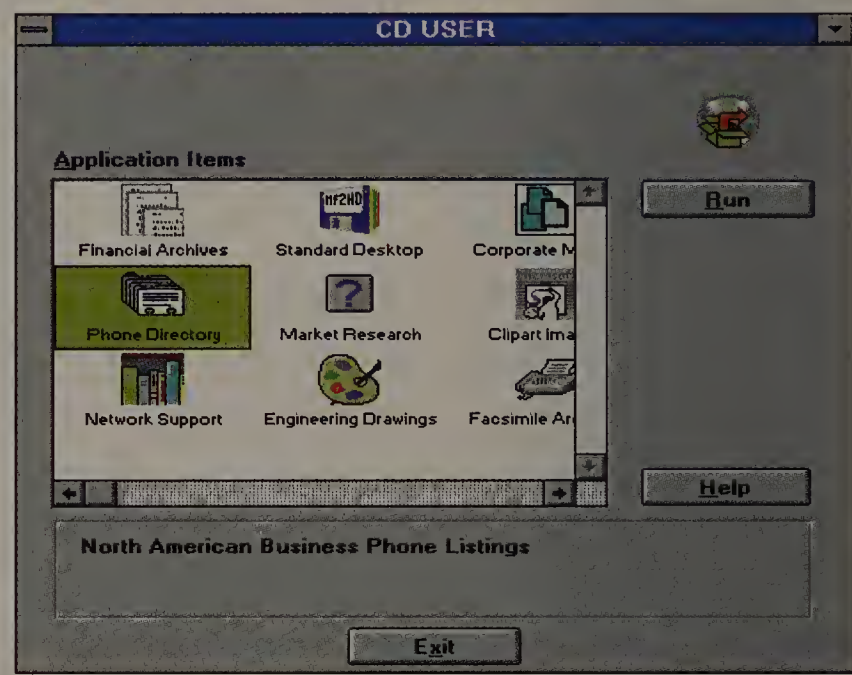
Share and Create CD-ROMs on the LAN

Meridian Data's two most recent programs could make it easier for networked employees to share CD-ROM devices, including CD-Recordable ones. Both programs work with Novell NetWare versions 3.12 or 4.1 and are packaged as NetWare Loadable Modules for easy installation and management.

CD Net 1.0 for NetWare lets you attach CD-ROM drives to a NetWare file server. It works with NetWare Directory Services, making it easy to locate information on the local area network. CD Net simplifies the process of accessing CD-ROMs from your PC: Just click on customizable icons your administrator has set up, and you can see the names of all the available discs. The program's management tools work from any PC with LAN administrative access, and across multiple servers. The Flexible Volume Grouping feature lets the LAN administrator map numerous CD-ROMs under one Windows drive letter (important because DOS limits your PC's number of drive letters to 26).

CD-R devices, which now cost less than $1000, let you create CD-ROMs for archives, storage of confidential data, and distribution of data. They have always needed a dedicated PC, but Meridian's CD NetRecord 1.0 for NetWare lets you attach a CD-R device to your NetWare file server. Because the server remembers and processes requests, people can send jobs to the CD-R device much as they send network print jobs. We didn't test CD NetRecord, but its drag-and-drop interface looks simple to use.

—Laurianne McLaughlin



IT'S EASY TO SHARE CD-ROMS on your LAN, using CD Net 1.0 for NetWare. Click on an icon to use a CD-ROM such as a phone book.

CD Net 1.0 for NetWare and CD NetRecord 1.0 for NetWare

Share CD-ROM drives and CD-R devices.
Meridian Data
800/767-2537, 408/438-3100
Pricing: CD Net, $795 for up to 25 users; CD NetRecord, $995 per server
Reader service no. 650

New Procomm Adds Netsurfing to Fax and Data

Datastorm's Procomm Plus 3.0 for Windows offers smoothly integrated data, fax, and Internet capabilities that set it apart from communications packages as well as Web browsers. If you've used previous versions of Procomm for Windows, there's virtually no learning curve.

The most notable new features in Procomm Plus 3.0 are its complete Internet capabilities. Datastorm employs the Spyglass 2.0 Web browser and adds a raft of interface enhancements so it's easy to use and resembles the rest of Procomm. Right-clicking on your mouse brings up context-sensitive menus that make navigating the Web simple. Datastorm also facilitates Internet setup. Although Procomm Plus 3.0 includes a TCP/IP stack, it does not go out and blithely replace your existing winsock with its own. If you're starting from scratch on the Web, it will install everything you need and hook you up with national service providers, or you can use a local provider. There are also full e-mail, news reader, FTP, and Telnet capabilities.

Procomm Plus 3.0 doesn't scrimp on data and fax capabilities. The communications process is easier, with more on-screen help, caller ID support, more terminal emulation, and an automated CompuServe agent that lets you work offline, much like WinCIM. The fax side includes a fax manager for managing heavy traffic, support for multiple modems for fax broadcasting, and optical character recognition.

The smooth integration of all these pieces saves time. For example, you can grab a Web page and fax or send it to another person, without having to start separate applications.

Procomm Plus 3.0 has potential flaws. The package worked fine under both Windows 3.1 and Win 95, but its apps are 16-bit and aren't as stable as true 32-bit applications. Also, you can't use long file names with Procomm Plus 3.0. However, Datastorm plans to ship a true Windows 95 version of Procomm later this year.

—Stan Miastkowski

Procomm Plus 3.0 for Windows

Integrated data, fax, and Internet communications.
Datastorm
800/474-1547, 513/443-3282
http://www.datastorm.com
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It's what you don't see on your hard drive that causes problems. Every application puts bits and pieces of itself in places you don't know about. Without UnInstaller, things can slow down — or come to a screeching halt.

And, as an added safety net, UnInstaller automatically compresses and backs-up everything it removes. So, as you clean off bits and pieces of old files, you can take comfort in being able to put things back exactly as they were with the simple click of a button.

Of course, with other deletion programs you can have the experience of getting rid of things you never meant to get rid of. Which may be good for us, but bad for you.

Why take your chances with just any old clean-up program? UnInstaller is the No. 1-selling Windows utility on the market with more than a million copies sold.

1-800-922-3383

Available at your local software store. MicroHelp is at www.microhelp.com

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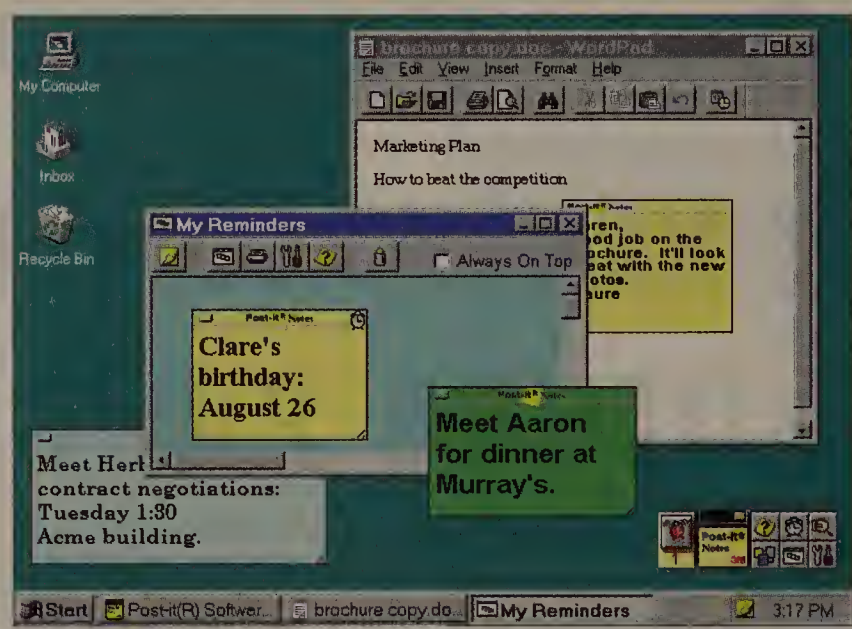
MicroHelp

HEY, EVERYONE CAN USE A LITTLE HELP.

Electronic Post-it Notes

Like its paper predecessor, 3M's **Post-it Software Notes** inspires the question, How come someone didn't think of this before? No other "sticky notes" program has Post-it's features. We tested a shipping version of this utility, which lets you attach a small note to any document. Just click on the program's yellow Post-it icon to attach a note or open one. The notes can be embedded in a document or sent by themselves through Microsoft Mail and Microsoft Exchange or Lotus cc:Mail and Lotus Notes for Windows 95, according to 3M. To remind yourself of tasks, you can use an alarm feature. Alarms can be set on a onetime, daily, weekly, monthly, or yearly basis. While paper Post-it notes are known to disappear, these electronic notes won't: You can find misplaced Post-its by clicking on the program's Find button and searching for specific text. Compatible with Windows 95 and Windows NT, Post-it Software Notes lists for $24.95. 3M, 800/364-3577.

Reader service no. 655



STICK IT TO 'EM: 3M's Post-it Software Notes lets you attach a note to any document and set personal reminders with alarms.

High-Capacity Backups

To meet today's storage demands, many PCs include hard drives with capacities of a gigabyte or more—so the ante for data backups has been raised too. Tandberg Data has met this challenge with its **Panther Mini 2000** minicartridge tape drive. This SCSI-2 drive uses Sony QIC-Wide 3.5-inch minicartridges that accommodate 2GB of compressed data. The unit formats cartridges as it writes to them, a bonus since unformatted cartridges cost less than the preformatted kind some tape drives require. In addition, the Panther speeds up the process by automatically verifying data as it writes it to tape, rather than making a second pass of the tape. The internal version of the Panther Mini 2000 is street-priced at $489; street price for the external version is $579. Tandberg Data, 805/579-1000.

Reader service no. 656

The Net Results

Some people like text, others like pictures. If you're a picture person, Clear Software's new utility is worth a look. We used a preproduction copy of **Clearweb**, which lets you organize all kinds of Internet information—World Wide Web URLs, e-mail addresses, FTP sites, search results—in navigable graphic maps. The utility lets you share these maps with other users, either by distributing them via e-mail or publishing them on the Web. In either case, recipients need a copy of the free Clearweb viewer, which comes with the product; the viewer can also be downloaded from the company's Web page (http://www.clearsoft.com). This otherwise easy-to-use product has one limitation: When you view a map in full, you can't read the text labels on individual cells. But when you zoom in close enough to read the text, you lose the big picture. Clear Software doesn't plan to address this problem in the shipping version of its utility. List price is $49. Clear Software, 800/338-1759, 617/965-6755.

Reader service no. 657

Portable Surge Protector

Zap! There goes your data! Lose a hard disk's worth of data and applications one time and you'll learn the importance of connecting your PC and related equipment to a surge protector. But surge protection boxes can be heavy and clunky, especially on the road. So next time you travel with your expensive portable computer, you might want to take along Curtis's **Surge Traveler**. The portable, 3-pound device has two AC outlets for a PC and a peripheral, plus two modular telephone jacks for fax-modem protection. A retractable 8-foot cord is built in, and a 6-foot telephone cord is included. The Surge Traveler handles a maximum spike current of up to 6000 amps with a response time of less than 1 nanosecond. This $34.99 device comes with a 10-year, $5000 warranty. Curtis by Rolodex, 800/955-9514.

Reader service no. 658

SURGE PROTECTION ON THE GO: Curtis's lightweight Surge Traveler guards your portable PC from power spikes.

OS/2 Communications Help

Compared to competing "lite" communications packages for OS/2, **RhinoCom Home 1.5** has more power and is easier to use. Its customizable install program autodetects your hardware, a tutorial gets you up and running in no time, and the on-screen help system is exhaustive. We tested a shipping copy. The software includes support for the ZModem protocol, CompuServe B+ transfers (CompuServe's own file transfer protocol), VT100 emulation, and macros and log-on

FREE
UPGRADE TO THE WINDOWS 95 VERSION**

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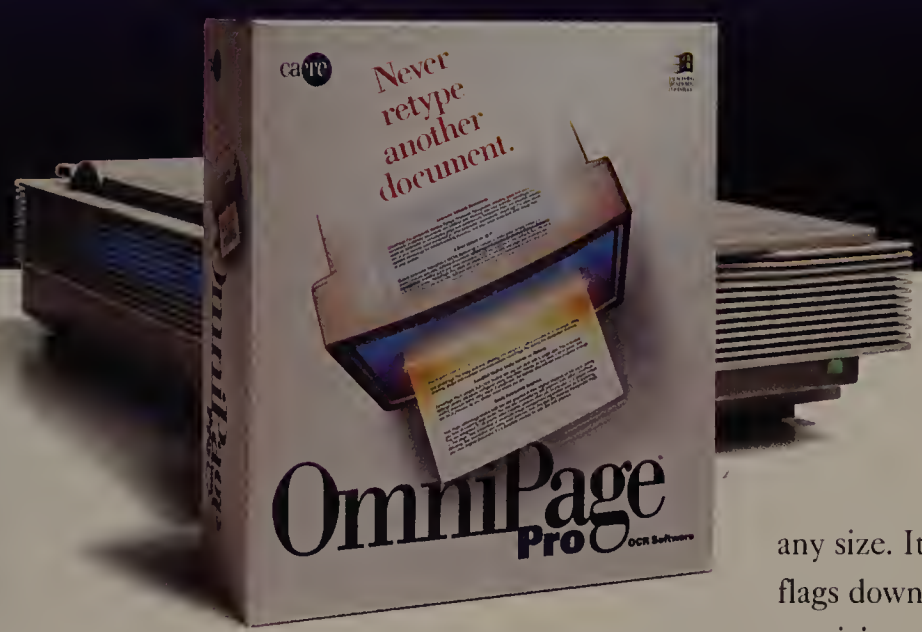

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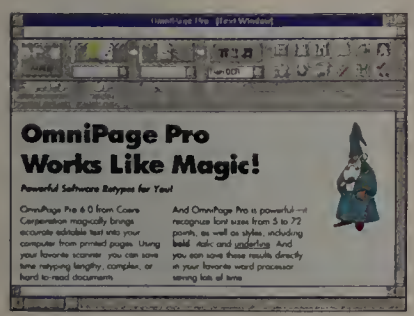

OmniPage Pro 6.0 is ten times quicker than the fastest typist—and still delivers pinpoint accuracy.

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"OmniPage's automatic OCR is goof proof."
InfoWorld 3/6/95

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Circle 91 on reader service card

A BETTER MONITOR STAND: MediaMate's CD Monitor Deck has storage slots that accommodate 21 discs.

scripts; it also offers a configurable status/control line with modem information. The only features missing from the Home version of RhinoCom are host mode (which would let a PC answer incoming modem calls), YModem and Kermit protocol support, and advanced scripting for automating communications tasks. The product makes good use of OS/2's Workplace Shell: RhinoCom objects are configurable for each phone number you call, and collections of numbers can be dialed sequentially and grouped together. Street price is $69. Rhintek, 800/234-4546.

Reader service no. 659

Monitor Stand Holds CDs

Most stands for computer monitors raise the screen to your eye level, but that's it. The MediaMate **CD Monitor Deck**, a heavy-duty plastic stand, cleverly doubles as a CD and CD-ROM storage rack. The stand, which supports monitors of up to 19 inches diagonal in size, lifts them a height of four inches (which is not adjustable). Underneath this tablelike deck, you'll find slots to fit 21 discs. The space-saving monitor stand comes in one color, computer beige. List price is $31.45. Hunt Manufacturing, 800/977-6662 ext. 9153.

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Many people who work in sales and marketing positions like the GoldMine contact management program. Designed for workgroups, this very customizable application helps manage contacts, e-mail, group scheduling, and basic sales force activity reports. We saw a preproduction version of **GoldMine for Windows 95**, which offers three new features. First, its Internet integration lets you send and receive e-mail messages from within the GoldMine interface. E-mail messages are linked to your contact names, just like phone calls or appointments. Second, new embedded wireless paging capabilities let you use GoldMine to send e-mail messages to alphanumeric pagers. And finally, wizards make it easier to learn and use the software. List price is $295 for one user, $895 for a five-user license. GoldMine Software, 800/654-3526, 310/454-6800.

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CUSTOMIZABLE CONTACT MANAGER: GoldMine for Windows 95 offers Internet integration and wireless paging features.

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If your notebook doesn't have a built-in CD-ROM drive, consider the Panasonic **KXL-D740** portable quad-speed drive. Weighing in at only 14 ounces, it connects to your notebook's PC Card Type II slot or desktop PC's SCSI-2 interface card. This drive's access time is 295 milliseconds, and it has a respectable transfer rate of 600 kilobytes per second. The unit runs on six AA batteries: Panasonic says you'll get up to 2 hours of use for data-based CD-ROMs, or up to 4 hours of use for audio CDs. List price is $499. Panasonic, 800/742-8086, 201/348-7000.

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One of the least expensive self-help applications, **Small Business Legal Pro 2.0**, provides legal forms, business letters, and advice. A solid search engine helps guide you to what you need, and the information is free of cumbersome jargon. Version 2.0 offers no new features, but has new content on bankruptcy laws and on how to organize your business as a limited liability company. Designed to run on Windows 3.*x*, this program lists for $39.95. Nolo Press, 800/992-6656.

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PC WORLD "The Quantex QP5/133 SM-1 still delivers a whopping amount of computer for the money. It costs nearly $1000 less than its typical Pentium-133 competitor..." (November '95)

PCComputing Quantex QP5/100 SM selected Top Pick: Pricewise Direct System. "You can't get more for less. We checked" (November '95).

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- Microsoft Internet Explorer 2.0

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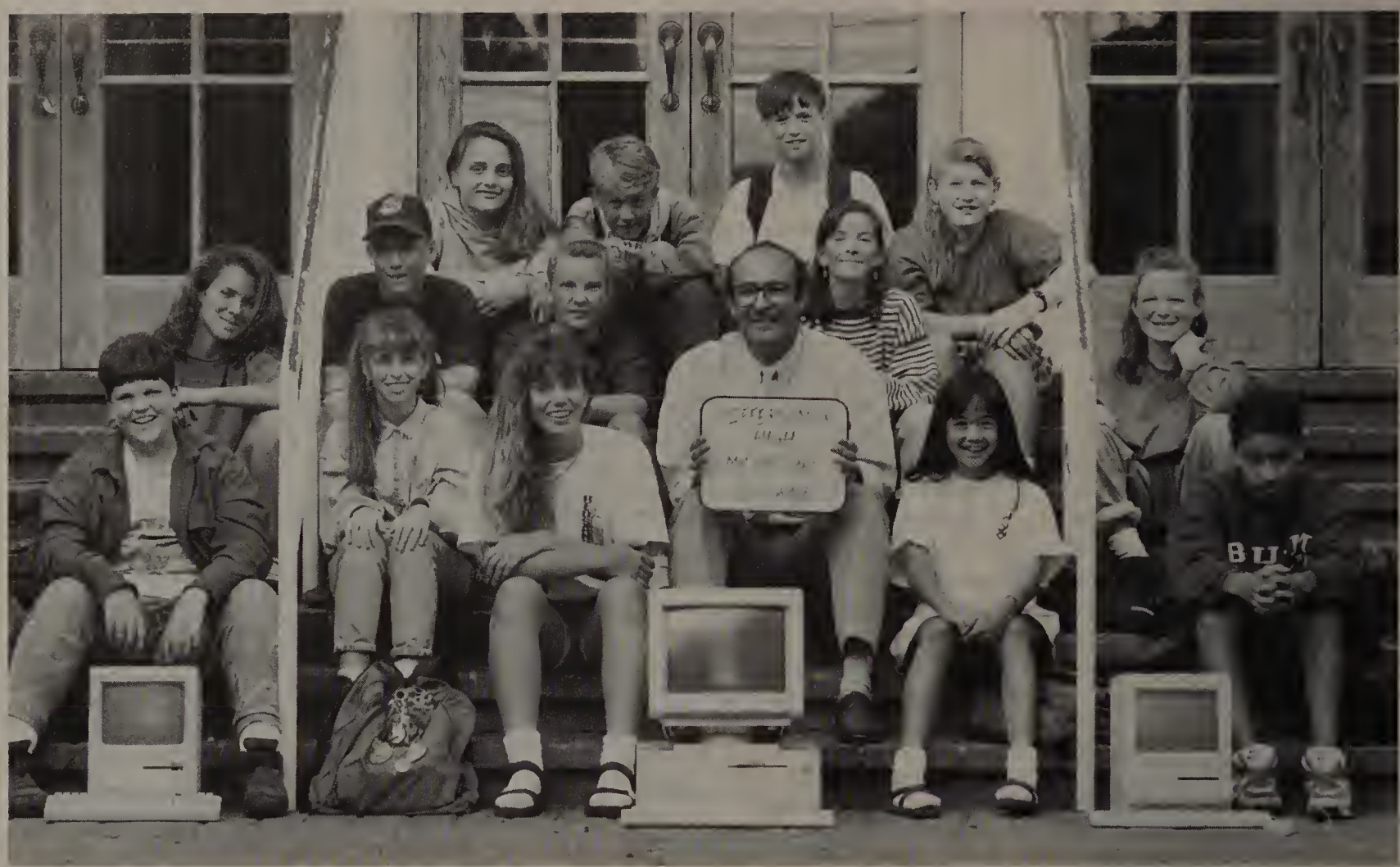

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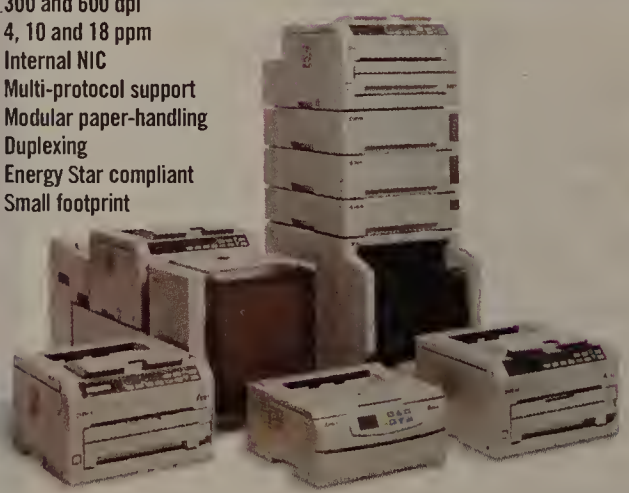

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Circle 127 on reader service card

SPECIAL REPORT

Workgroup Computing

GET THE NETWORK RESOURCES YOU NEED

INSIDE

The Best Workgroup Servers

98 What's the best candidate to run your network? Check the results of our first server roundup.

Netware, NT Duel for Apps

106 Which network operating system will support the client/server applications you need?

Edited by Eric Bender

ILLUSTRATION BY RON CHAN

The Best Workgroup Servers

BEST BUY: HP NETSERVER 5/133 LH offers workgroups an excellent combination of performance, expandability, software management tools, support programs, and price.

Introducing PC World's network server reviews—an exclusive series of regular lab-based roundups of PC servers.

By Eric Bender and William L. Rinko-Gay

The typical local area network server is a jack-of-all-trades, but of very different trades than those mastered by the computer sitting on your desk. Servers deliver your mail, fetch your files, and collect documents for printing. They may also run a slew of applications, hook you up to the World Wide Web, act as gateways to massive corporate databases, or polish off a number of other, but essential, odd jobs.

You can try turning standard personal computers into network servers, but you're better off buying a system that has been designed for the job. Servers are not just PCs on steroids. They offer the kind of bulletproof operation we still don't expect from desktop PCs. And they come in a much broader range of configurations, with many highly customized features for networking needs large and small.

So how do you pick the server that will suit you and your workgroup? Look for the right mix of features, upgradability, service, support, reliability, and good performance on the kinds of jobs that you expect your server will run—plus, of course, the right price. We took all these factors into account in conducting rigorous tests at our new Network World–PC World Network Test Center in Spring, Texas.

Workgroup Wonders and Wanna-bes

We kick off our reviews with the Top 3 Workgroup Servers—the best contenders for networks with a maximum of a few dozen users. The machines in this roundup have one CPU, 32MB of memory, a single network adapter, and (usually) less than 5GB of disk storage. Ranging in price from $5539 to $10,738, they also offer many high-reliability and server-management options, such as the ability to page a network administrator as problems arise.

We were pleasantly surprised by how well the workgroup servers performed, particularly at file service. We thought we'd max them out with 16 clients—after all, each client was running an automated application script that loaded up the server at least 15 times as much as a normal user would. But we didn't. The current crop of servers employs fast-and-wide SCSI-2 drive technology on a PCI bus to meet the heavy demands of our benchmark.

The customized installation software and CD-ROM documentation that came with most of these products made it far easier to get them up and running, but it's still a job for a network professional.

How We Rate Service

Our server tests follow the same guidelines as *PC World*'s Top 10 and Top 20 reviews. Each product is rated on a combination of performance, features, pricing, reliability, and service and support.

In our PC WorldBench for Servers tests, we look at performance running real-world applications. We run up to 16 Windows 95 clients with servers running NetWare 4.1 and Windows NT Advanced Server 3.51 through a high-speed switch providing a single Fast Ethernet connection to the server.

For the file service tests, we modified four of our PC WorldBench benchmarks so that both data and applications are stored on the server's hard drive (or drives).

In addition, we ran two client-server benchmarks—one with Lotus Notes 4.0, the other with Microsoft Access 7.0 for Windows 95 on the client PCs and Oracle Server7 version 7.2 on the server, with Intersolv Data Direct ODBC Driver Pack providing the glue between them. The Notes test is built on two GroupQuest Software applications that handle human resources and client tracking jobs. For the Access/Oracle test, we built a database with four tables joined to emulate typical payroll functions.

In evaluating features, we paid particular attention to components that set these machines apart from their desktop kin, such as disk arrays and server installation tools. We judged reliability on features such as product certification, management options, and high-availability hardware options. We assessed service and support by examining vendor support policies and options.

We'll broaden our coverage to Top 5 Workgroup Servers in the August Workgroup Computing report. We will also add Top 5 Enterprise Servers—rating more powerful systems that run larger nets. And this spring, we'll publish additional data on our performance testing procedures and test results on PC World Online's Web site (http://www.pcworld.com). We will be updating our Top 5 lists monthly on the site.

Eric Bender is an executive editor for PC World. *William L. Rinko-Gay directs the Network World–PC World Network Test Center.*

For more information on all products in this article, circle reader service no. 913.

BUYING TIPS

Servers are very expensive and highly customized systems that require careful purchase. Some hints:

- **Buy a dedicated server, not a high-end PC.** These machines offer a host of important enhancements for better performance, compatibility, administration, and support. You pay a relatively small premium—especially considering what it costs you when a server is down or not working effectively.
- **Will your file server need to become an application server?** It may eventually run applications that you aren't yet considering (such as Web services). If so, you'll probably want to boost its horsepower, so there's considerable value in CPU upgrade options and in spare slots (especially PCI slots) and drive bays.
- **Consider high-reliability hardware options.** Costs are dropping quickly for hot-swappable disk drives and some other hardware components that help to guard against server crashes.

HP NetServer 5/133 LH

PROS: Excellent performance, good expandability

CONS: None significant

Our Best Buy workgroup server is a top-end machine with an impressive mix of performance, features, and software tools—and at $8229 it's priced very reasonably for what you get. The HP NetServer 5/133 LH comes with a Pentium-133 CPU and no less than four 1.05GB SCSI disk drives and two disk controllers. Windows NT and NetWare put these performance enhancers to excellent use, supporting data striping in drives and controllers. (Data striping boosts performance by storing individual files on multiple drives.) The results were particularly striking on the file service tests, where the NetServer beat all comers by a wide margin.

The NetServer box is large, short, and squat—about the size of an ottoman. The inside is nicely organized, very serviceable, and has little wasted space. Its hard drives are all hot-swappable, so you can replace one without bringing down the server—and without losing data, if you've configured an optional disk array to support it. It has room for six drives and lots of open slots—four EISA, three PCI, and one combined slot. (PCI slots are precious, both for performance and because most makers of server add-in cards are focusing on PCI.)

To make installations and recoveries from server crashes easier, the NetServer comes with a bootable CD-ROM, a nice touch. It's part of a CD-ROM Configuration Assistant with online documentation plus EISA configuration, drivers for network operating systems, utilities for configuring cards and a hard disk array (if you have one), installation tips, and NetServer Assistant (server management software that works with HP's OpenView network management software). Both Windows NT and NetWare were preinstalled by HP, dual-booting from the same drive array. Combine these software helpers and HP's 7-day-a-week, 24-hour phone support and renowned service and support capabilities, and you'll sleep better at night.

ROBERT CARDIN

Compaq ProSignia 500 Model 5/120-2100

PROS: Good performance, well-integrated components

CONS: Only one PCI slot open as tested

The Compaq ProSignia 500 is a capable, thoughtfully designed workgroup server that offers a good internal layout, superior documentation, and strong price/performance. At a street price of $5539, two-thirds the price of the HP NetServer, it's a good entry-level choice for workgroups that can't afford the expandability or top performance that the NetServer, with its extra drives, offers. (The 150-MHz ProSignia 500 Model 5/150-2100 costs only about $100 more but arrived too late for this roundup.)

The ProSignia we tested, with a 120-MHz Pentium CPU, turned in a good performance, especially in our client-server database tests with all 16 clients. This reflects an efficient bus architecture and careful tuning for server tasks; for example, on most tasks the ProSignia resoundingly beat the Dell PowerEdge, despite the latter's 133-MHz CPU and similar hard drives.

The full-size minitower is roomy enough for a few additions but is not designed for space-eating technologies like SCSI drive arrays or multiple processors. Inside is a support person's dream: a configuration sticker clearly showing component locations and upgrade options. The model we tested came with one 2.1GB SCSI drive.

The four 3.5-inch hard drive bays are easily accessible without tools. While you can purchase an optional array controller, the chassis does not support hot-swappable drives. Mounted on custom drive rails, each drive can be removed by squeezing a simple latch. All the add-in card slots are quickly available as well. You will need a tool to get at the 5.25-inch drive bays.

Compaq provides SmartStart, a CD-ROM–based installation kit that lets you install NetWare, Windows NT, or other network system software fairly easily. As with the NetServer, the first disc is bootable. Our Windows NT setup was a breeze. NetWare 4.1's installation wasn't hard, although we had to manually install NetWare Directory Services after setup was complete, and we got no warning of this. (Compaq says the next release of SmartStart will automatically install NDS.) Another bootable CD-ROM provides a good mix of support software, including EISA configuration, operating system support software, Flash ROM utilities, and diagnostics.

Compaq's on-screen hardware documentation is well integrated, and Compaq's Insight Manager lets you keep an eye on the server. In addition, there's around-the-clock toll-free technical support and a three-year on-site service warranty, plus a fee-based Advanced Network Support agreement that reduces finger-pointing among vendors. All in all, this is a very strong choice.

IBM PC Server 320

PROS: Well designed, good management software

CONS: Mediocre performance, just one PCI slot open as tested

Long famous for arcane product names, IBM stuck to the basics a year and a half ago when it named the PC Server line. And the $8599 PC Server 320 is a good basic workgroup server.

It also shows vividly that the speed of the CPU does not always dominate a server's performance. The PC Server 320 carved out acceptable test scores despite having just a 90-MHz Pentium.

The box is tall and thin. It's easy to get to SIMM sockets, PCI and EISA slots, and processor sockets; you can add a second 90-MHz CPU. Getting to the drives is a bit more difficult, because you must slide them out the cramped back of the bay area. On the plus side, they screw directly into the bays so you don't need to bother with proprietary drive rails. The system is quiet and well cooled. Our test machine included four 1.2GB Quantum SCSI drives with 1MB of disk cache.

Our machine came with Windows NT Server installed, but that network operating system was not included in IBM's CD-ROM–based Server Guide. Unfortunately, we had to reinstall NT because of problems

THE BEST WORKGROUP NETWORK SERVERS

Designed for networks with up to a few dozen users, workgroup servers need to offer the right mix of price, performance, features, upgradability, reliability, and service and support. These Top 3 machines also offer strong installation and management aids.

TOP 3 WORKGROUP SERVERS

	Overall rating	Performance rating	Features rating	Street price [1]	CPU	RAM (MB)	Hard drives/individual capacity (GB)	Open I/O slots/open bays	Reader service number	Comments
1 HP NetServer 5/133 LH 800/322-4772	91	89	85	$8229	Pentium-133	32	4/1.05	8/4	676	Excellent performance, good expandability and software tools.
2 Compaq ProSignia 500 Model 5/120-2100 800/345-1518	88	76	76	$5539	Pentium-120	32	1/2.1	4/4	677	Well-designed, capable all-around server at a very good price.
3 IBM PC Server 320 800/426-3333	82	67	77	$8599	Pentium-90	32	4/1.2	5/3	–	Solid server offers good software tools but mediocre performance.

[1] Vendor estimates.

BEST BUY

Methodology The overall rating includes ratings for features (35 percent) including hands-on evaluation, performance (30 percent), price (20 percent), and reliability and service and support (15 percent). For all ratings, higher is better. Data based on tests designed and conducted by the Network World–PC World Network Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 905.

Deciphering the easiest way to network your Windows-based PCs will require, among other things, a keen sense of the obvious.

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	Windows NT Server	NetWare
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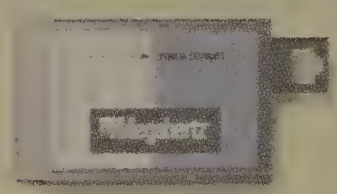

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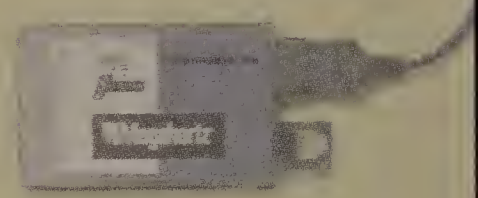

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running one test. The Server Guide worked well when installing NetWare and even added a reminder that we would have to install NetWare Directory Services later. Oddly, it didn't detect the IBM network adapter, but it did warn us about this problem, and the proper driver was on a floppy disk. On the upside, IBM bundles in PC SystemView, a premier software tool for managing servers and all the other machines on your network.

Documentation is good and plentiful. Like Compaq and HP, IBM offers good service and support programs, including around-the-clock phone support, a three-year on-site warranty, and a host of added support options. In short, this is a very capable but not spectacular server.

Best of the Rest

These servers were tested and reviewed along with the others but didn't score high enough to reach the Top 3 chart.

CSS MaxPro 1500 P5-166

PROS: Top-end disk storage system, good performance

CONS: A few design glitches, no open PCI slot as tested

The MaxPro reminds us of certain radio talk show hosts—big, heavy, loud, with plenty of fans, and surprisingly fast on its feet.

Priced at $8999, this is one heavyweight server—in fact, at 91 pounds, it's one of the heaviest Intel-based systems we've seen. It's also a powerful machine, with a 166-MHz Pentium (you can add a second CPU) and three 2.3GB hot-swappable SCSI hard drives. The disk controller features 4MB of disk cache and supports data striping. The MaxPro placed second to the HP NetServer on the file service tests, and third behind the NetServer and the Compaq ProSignia running our two client-server application benchmarks.

It comes with no less than 17 fans—not an elegant approach to ventilation—and some components are hard to access. And it lacks an open PCI slot, although it does have four EISA slots (and even four ISA slots), so you do get plenty of room to expand. There's a dual power supply.

The documentation is reasonably comprehensive but primarily focused on components rather than the complete system. CSS omits tailored installation software, although it will preinstall NetWare. The supplier provides 12-hour phone support five days a week plus limited fee-based service plans. *CSS, 714/852-8161* **Reader service no. 855**

Dell PowerEdge SP 5133-2

PROS: Good upgrade path (including second CPU)

CONS: Costly, mediocre performance

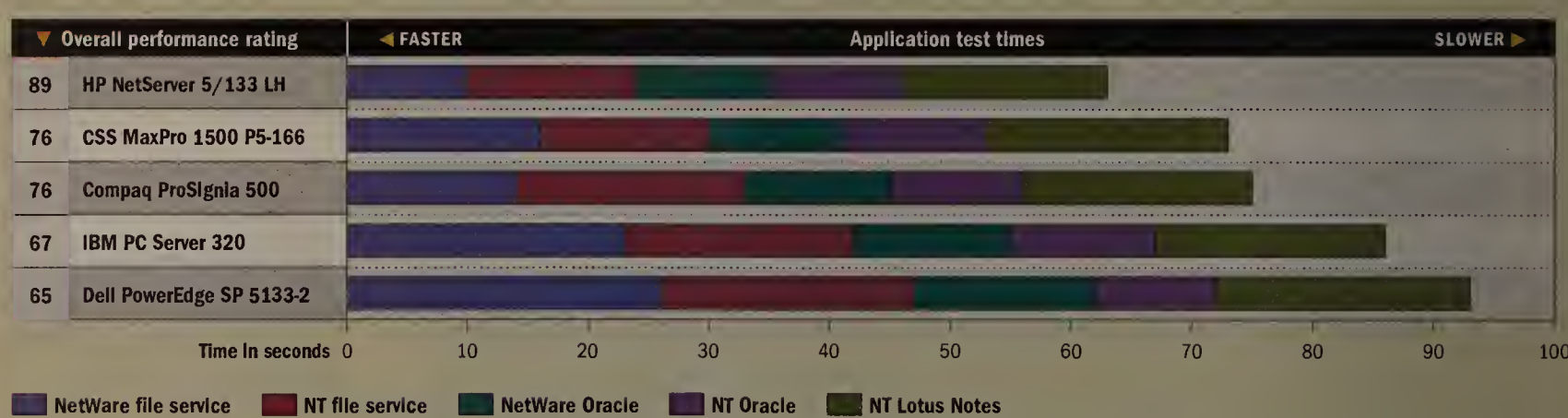
The PowerEdge is a capable server but not quite as polished as several of its rivals. It came in dead last on our file service and Lotus Notes tests, doing well only with Oracle on NT. And at $10,738 it is by far the most expensive server in this roundup.

Our model came with a 133-MHz Pentium CPU and two 2.1GB SCSI disk drives. You can add a second CPU using a ZIF socket. The large tower configuration offers easy access to disk drives. You must remove the entire cover to get at the expansion bus, and you need to disconnect several cables before taking out the motherboard (which you must do to work with SIMMs). Two large fans keep everything way cool.

Documentation is good, although it includes some unrelated material, and there's more printed documentation than most servers provide. Dell doesn't offer a custom install tool but will preinstall NetWare 4.1. The PowerEdge includes SafeSite server management software, and Dell offers a full range of support options, including around-the-clock support. *Dell, 800/289-3355* **Reader service no. 856**

TEST REPORT: PERFORMANCE FOR WORKGROUP SERVERS

We were pleasantly surprised by the speed of the workgroup servers in this review, which was particularly impressive on the file service benchmarks. HP's NetServer easily posted the fastest times on the file service tests and took a narrow overall lead on the application tests.



Methodology We tested each server under NetWare 4.1 and Windows NT Advanced Server 3.51. Each system was tested as supplied by the vendor; we set system parameters for application tests as recommended by the application and network operating system vendors. These results show average time among 16 client PCs to complete all tests. Each client was a 100-MHz Pentium PC with 16MB of memory, Windows 95, and a 10Base-T network adapter. Each server had a single 100Base-T network adapter. Test results were normalized and weighted for the total performance rating (60 percent for file service and 40 percent for application service). The NT and NetWare tests are not designed to be comparable. For a complete description of our testing methodology, see PC World Online's Web site (http://www.pcworld.com).

File services (NetWare and NT)
The file service benchmark is based on four applications in the PC WorldBench 1.0 suite (1-2-3 release 5 for Windows, Excel 7.0 for Windows 95, Word 7.0 for Windows 95, and WordPerfect 6.1 for Windows) modified to push the server's storage system as hard as possible.

Microsoft Access/Oracle Server (NetWare and NT)
This client-server database application runs with Microsoft Access 7.0 for Windows 95 on the client PCs and Oracle Server7 version 7.2 on the server. It emulates common payroll tasks.

Lotus Notes (NT)
This test is built on two GroupQuest Notes 3.0 applications that handle human resources and client tracking jobs. All run under Notes 4.0 on client PCs and server.

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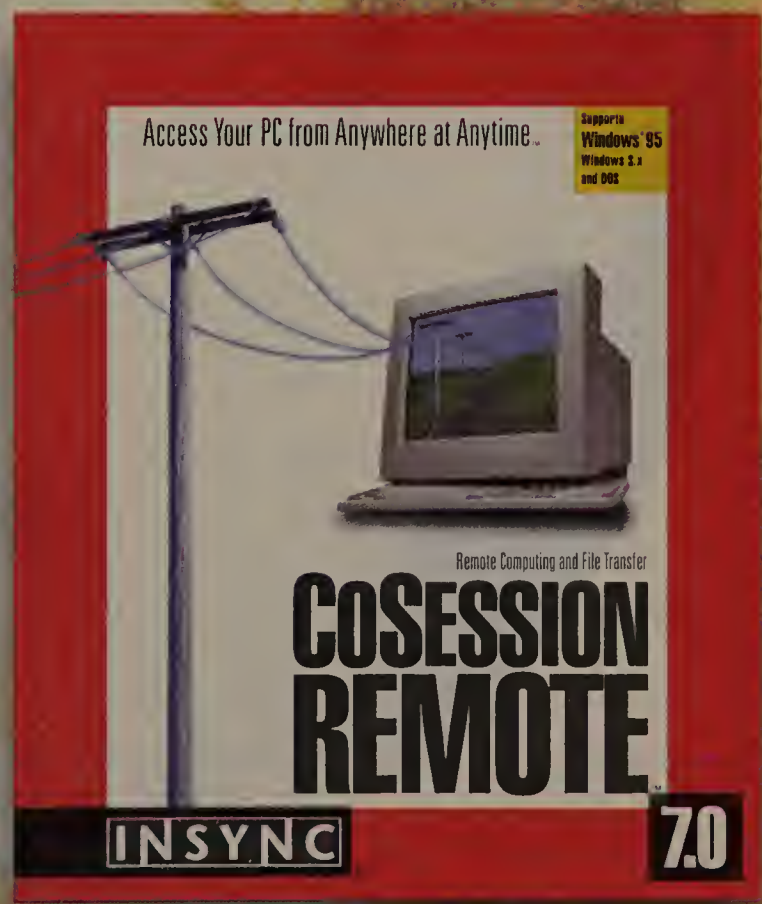

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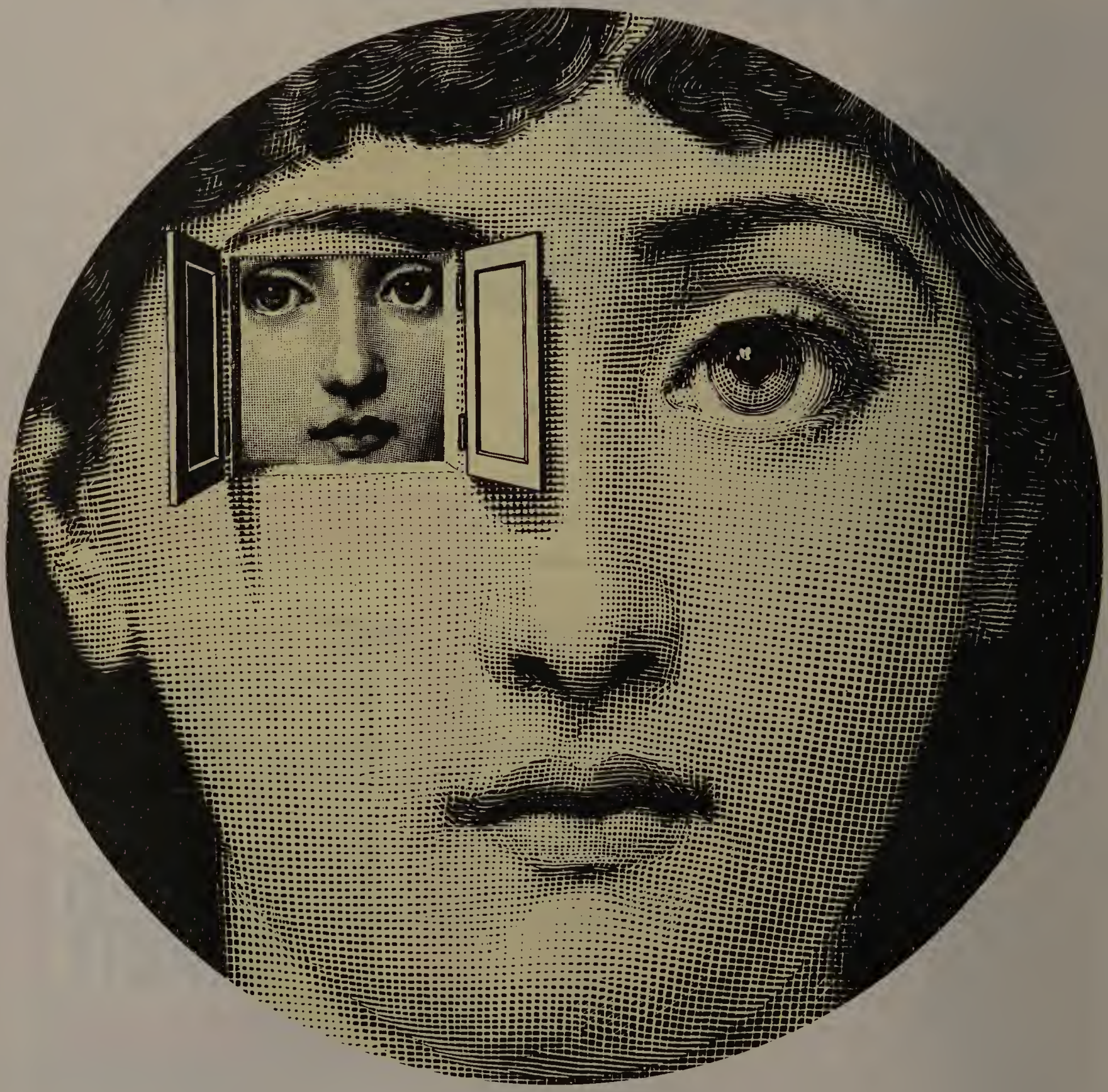

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NETWARE VS. NT SERVER

NetWare, NT Duel for Apps

Which network operating system will run the programs that you need?

Meet C. Sam Smith, chief executive of First Waco National Bank—and Novell's worst nightmare. When Smith's Waco, Texas–based bank decided to set up a 20-user network back in 1991, it chose Novell's NetWare as its network operating system. "That was the only way to do it then," Smith says. But First Waco National has since standardized on Microsoft software, including the Windows NT Server network operating system. "When Microsoft announced the development of NT, we said 'Yeah, ship it'," says Smith.

Stories like Smith's give Novell executives heartburn. The Provo, Utah, networking giant isn't in any immediate danger of losing its leading role in networks—recent estimates give NetWare about 60 percent of the network OS market. But Microsoft's Windows NT Server is rapidly gaining industry support, particularly as a platform to deliver applications rather than just the traditional file and print services. "There's a tremendous amount of interest in NT among both customers and developers," says Jamie Lewis, president of The Burton Group, a network consulting firm in Salt Lake City.

Novell Adds Directory Assistance

Novell touts NetWare 4.1's Directory Services as a key feature for network applications. NetWare Directory Services is an information database that organizes network resources (user names, groups of users, printers, CD-ROM drives, and other components) into a hierarchical tree structure. NDS allows network administrators and end users to access all authorized resources by logging on to the network just once instead of having to log on to each individual server, thereby saving time and money.

If a small business is running fax, e-mail, and database applications on its LAN, for example, each of these programs can be listed as a separate resource in the NDS directory. The network administrator can then use the NDS interface to set up new users for each application.

Add NDS to NetWare's traditional network talents, Novell says, and application developers have compelling reasons to develop NetWare Loadable Module programs—client/server packages running only on NetWare servers. Currently over 50 such packages support NDS, including Cheyenne Software's Faxserve network fax software, IBM's Lotus Notes, and Novell's own GroupWise groupware.

C. SAM SMITH (above) SWITCHED TO WINDOWS NT SERVER, hoping this would make it easier to deliver Windows applications on First Waco National Bank's network. But Verandas Development's Mike Hughes (left) is sticking with NetWare: "If I've got a good thing, why monkey with it?"

But some firms offering these NDS packages support Windows NT Server as well. For instance, Symantec, which sells a version of Norton AntiVirus for NetWare, is developing a similar application for Windows NT Server, says Elizabeth Cundiff, senior product manager for Norton Administrator for Networks at Symantec in Santa Monica, California.

The verdict is still out on the software industry's support for NDS. "I can't find many manufacturers who are standing up and saying 'Yes, we think that's the way to go'," says Dataquest analyst Chris Le Tocq in San Jose, California.

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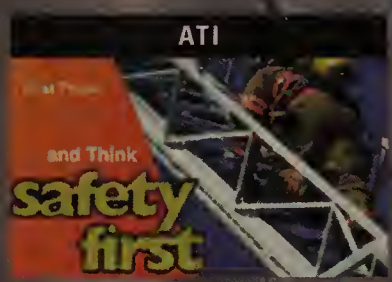

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Historically, Microsoft has done a far better job than Novell of providing application developers with suitable tools, support programs, and marketing assistance. Refocused on its core networking business, Novell says it plans to turn that situation around.

NetWare has also lagged far behind NT in supporting multiprocessor servers, which is becoming a crucial requirement for customers running resource-hungry client/server application packages. But the company has finally shipped a multiprocessor version of NetWare, and many application developers plan to support it by the end of the year.

At the other end of the spectrum, Novell is developing a NetWare bundle of applications designed specifically for small businesses. "It's a one-stop package," says Peter Clegg, Novell's manager of competitive marketing. While product details and pricing weren't available at press time, the bundle "will have features that are much more appealing to the low end," says Clegg.

Windows NT's Bountiful Bundle

The Microsoft camp promotes Windows NT Server's integrated utilities as essential network tools for businesses. These goodies include integrated backup software, a remote access package that lets Windows users dial in to the network, and built-in TCP/IP support for businesses that want to connect to the Internet.

Additionally, since the business world has mostly adopted Windows, many users and network administrators alike immediately feel comfortable with the NT Server 3.51 interface. (NT currently mimics Windows 3.1 and Windows for Workgroups, but NT 4.0 will present the Windows 95 interface.) "When Windows NT shows up on their desktop, a lot of the commands are already familiar," says Betsy Johnson, Windows NT Server product manager. "The fact that NT is a Windows-based product makes it easier for people to understand the network," agrees The Burton Group's Lewis.

Novell's response: NetWare also includes Windows-based utilities for LAN managers who prefer the point-and-click simplicity of a graphical interface.

In any case, Windows NT's perceived advantages plus Microsoft's towering industry presence have convinced droves of developers to create NT applications. At press time we had counted about 200 network applications customized for Windows NT Server, with many more on the way.

Picking the Right Network OS

Not surprisingly, both Novell and Microsoft claim to offer the best networking deal in town. If you look solely at the programs' street prices, NT wins, at least for small installations: For a ten-user license, Windows NT Server costs about $1000, while NetWare 4.1 comes in at around $1500.

NetWare can counter that its enormous installed base, which The Burton Group estimates at 50 million users, is a benefit in itself. "You're much more likely to find a reseller who will install NetWare for you" than NT, points out Dataquest's Le Tocq.

NetWare retains another important edge: customer loyalty. If a small business is satisfied with its NetWare LAN, Microsoft's promises of a better network OS may fall on deaf ears. "I've read about Novell's competition, but if I've got a good thing, why monkey with it?" asks Mike Hughes, controller of Verandas Development, a land development company in Marco, Florida. Hughes also applauds Novell's technical support. "Whenever I've had a question, I've always gotten a quick answer," he says.

But this doesn't keep other NetWare users from having wandering eyes, and their choice will come down to which network OS supports the apps they need. Tony Vent, controller of Staffing Resources, Inc., a temporary staffing agency in Kokomo, Indiana, says that although he's pleased with his company's five-PC NetWare net, he'd be "more than happy to look around."

- **NetWare** *street price $1500 (ten users); Novell; 800/778-1851*

Reader service no. 710

- **Windows NT Server** *street price $1000 (ten users); Microsoft Corp.; 800/426-9400*

Reader service no. 711

—Jeff Bertolucci

Jeff Bertolucci, a former associate editor for PC World, *is a freelance technology writer based in Denver.*

A SAMPLING OF LEADING PACKAGES

Windows NT Server is gaining a broad range of client/server software applications, but NetWare still enjoys wide backing. This table lists a few selected network applications and the network operating systems they support.

Product	Company	Application	Windows NT Server	NetWare
AutoCAD for Windows NT	AutoDesk	CAD	✓	
Collabra Share for GroupWise 2.0	Netscape	groupware		✓
Docs Open	PC Docs	document mgmt.	✓	✓
DraftWorks	Intergraph	engineering	✓	
DynaComm/Elite for Windows NT	FutureSoft Engineering	terminal emulation	✓	
Faxserve for NetWare	Cheyenne Software	fax		✓
FirstClass E-Mail Server	SoftArc	e-mail	✓	✓
Great Plains Dynamics LAN v2.1	Great Plains Software	accounting	✓	✓
GroupWise	Novell	groupware		✓
Hyperion Ledger	Hyperion Software	accounting		✓
Lotus cc:Mail	Lotus (IBM)	e-mail		✓
Lotus Notes	Lotus (IBM)	groupware	✓	✓
Microsoft Mail Server for Office	Microsoft	e-mail	✓	✓
Netscape Commerce Server	Netscape	Web server	✓	
Norton AntiVirus	Symantec	antivirus		✓
Oracle 7 for NetWare	Oracle	database		✓
Oracle 7 Workgroup Server for Windows NT	Oracle	database	✓	
Saros Document Server for Microsoft BackOffice	Saros	document mgmt.	✓	
Saros Mezzanine	Saros	document mgmt.		✓
SQL Anywhere	Sybase	database	✓	✓

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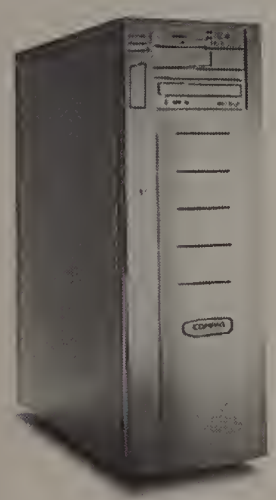

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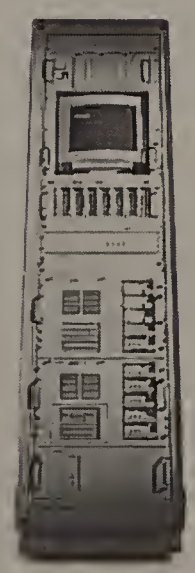

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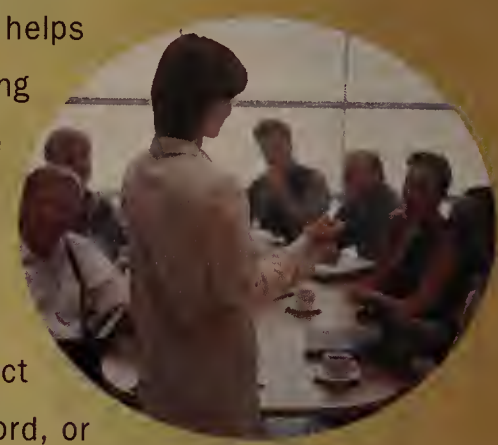
to hear the applause before you even speak

Introducing new Microsoft PowerPoint for Windows 95.

Now you can walk into any business meeting, both formal and informal, knowing you will make your point in a compelling way. New Microsoft® PowerPoint® helps you speak with confidence, whether it's in a one-to-one status meeting with paper handouts, a speech with 35mm slides, or a remote on-screen presentation shared simultaneously with clients and coworkers a thousand miles away. You build your case screen-by-screen, you know all the points you want to make will appear, you use all the power and flexibility of PowerPoint to add drama and impact to your message. Sentences appear on-screen by paragraph, word, or character to add emphasis where needed. Images can build in sequence. Specific points can be accompanied by sound, images, and video. With PowerPoint, you not only appear professional and prepared, you make your point in a more persuasive, a more compelling way.



Step-by-step, the software helps you build the presentation. It shows you how to use the program. It helps you communicate more persuasively.

PowerPoint does the hard work of pulling the presentation together for you. Select from topics such as selling a product or writing a business plan, and the program will suggest an outline, design, and format for your presentation. The AutoContent Wizard will tailor your message according to how much time you have and the type of output you wish to generate (35mm slides, paper handouts, on-screen presentations). StyleChecker will help you avoid presentation mishaps by checking for readability and common mistakes in spelling or punctuation. And to add visual impact, AutoClipArt will scan for key words and suggest appropriate clips or images. If you have questions at any time, ask the Answer Wizard for help. You type in a question, and it will walk you through the task step-by-step. When your presentation is built, you can preview and edit how it will look in black-and-white print outs, and then use the Pack and Go Wizard to automatically package it on disks so you can take it on the road.

Microsoft®

WHERE DO YOU WANT TO GO TODAY?™

Designed for Microsoft Windows 95

To see an autodemo and more, go to http://www.microsoft.com/msoffice.

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In both face-to-face meetings and remote presentations, PowerPoint puts you in command of the situation.

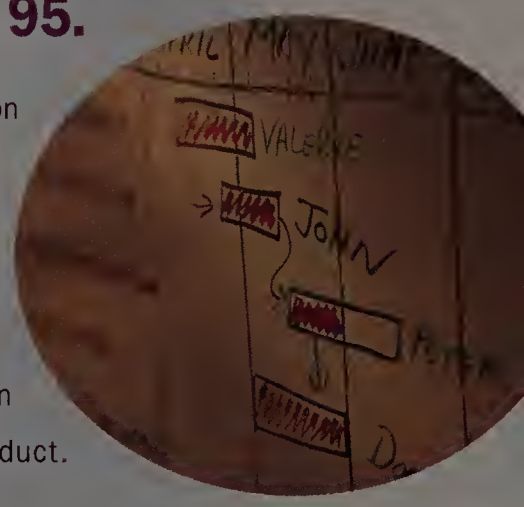
Even if your audience is on the other side of the world, you can still be in control. Presentation Conferencing lets you deliver and review your message with remote workgroups over a network. During the discussion stage, you can use the Slide Navigator to select specific slides from the presentation to reinforce the points you want to make, to answer spontaneous questions. And to make sure your meetings lead to constructive action, the Meeting Minder lets you take notes, record the minutes of a meeting, and assign action items on the spot. From start to finish, from building your case to making your point, new Microsoft PowerPoint helps you prepare, helps you speak with confidence, helps you make the most of any meeting.

Now you can take full advantage of Windows 95.

New Microsoft PowerPoint is designed to work hand-in-hand with new Windows 95 technology like multitasking and multi-threading. (Now you can keep working while your presentation is printing.) It was designed to integrate seamlessly with the other programs in Microsoft Office. Together, the new programs and the simplified user interface of Windows 95 make computing fundamentally easier. They make it easier for you to focus on your work, not on your software.

to guide
your project down a clear path

Microsoft Project for Windows 95.



Now you can manage projects more simply, more smoothly, by communicating project information as it occurs. With Microsoft® Project you can convey project status quickly and effectively so your boss, customers, and coworkers are always in the loop. From sharing task deadlines and responsibilities, to letting people know about changes and the impact they'll have on the deadline, you have the tools to organize your projects into manageable steps and keep them moving in the right direction. Microsoft Project unlocks the doors of communication and gives you the power to navigate the most efficient route to a successful end product.

Graphical views let teammates visualize where the project is going.

With Microsoft Project you can display project data in ways that everyone can understand. Great-looking Gantt Charts integrate text, timelines and graphical bars so everyone can see start and finish dates, interdependencies and task assignments. Throughout your project, you can also use a Monthly Calendar report to share your plan in a format that's clear and easy to read. And since Microsoft Project shares many of the same key commands with other Office applications, it will be easy to create schedules and reports. But if at any time you need help, type in a question and the Answer Wizard gives you the information you need. Microsoft Project helps you illustrate every phase of your project so you and your team keep your goals in sight.

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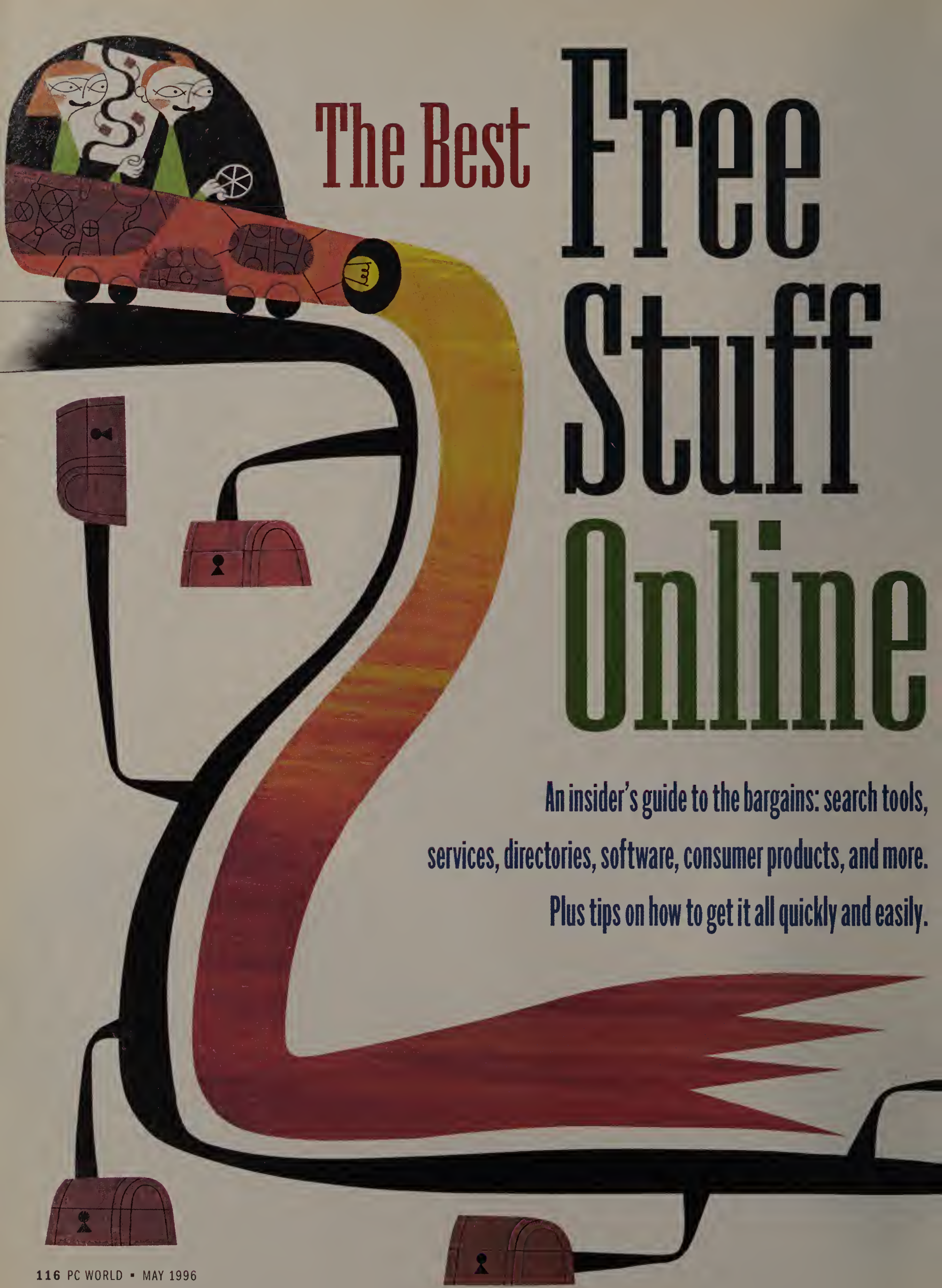
Keep everyone moving on the same track with open lines of communication.

Microsoft Project is completely integrated with a wide range of e-mail systems* and Schedule+ so that with a single click, changes and additions are immediately distributed to and from teammates. Assignments, task changes, and progress can be communicated and updated without ever reentering information, so you save time and eliminate mistakes. And because Microsoft Project is a member of the Office family, sharing data between programs is easy. For example, you can start building a schedule by simply dragging a task list out of Microsoft Excel and dropping it directly into your Microsoft Project plan. You keep communication clear and information consistent and your project continues to move exactly the way you planned.

Now you can take full advantage of Windows 95.

Microsoft Project is the world's best selling project management software and now is optimized to work hand-in-hand with the 32-bit performance, advanced multitasking, and simplified user interface of the Windows* 95 operating system. Together, they help open the lines of communication. Together, they help you enhance the way you manage your projects.



The Best Free Stuff Online

An insider's guide to the bargains: search tools, services, directories, software, consumer products, and more. Plus tips on how to get it all quickly and easily.

By Jeff Bertolucci and Steve Bass

118 Search Engines **119** Directory Assistance **120** Business Tools
120 Software Libraries **121** Freebie Central **124** Job Hunting
124 Books and Pamphlets **126** Travel **126** Help With Your PC

Free. It's a magic word for marketers and a siren song to consumers. Stick the word in an advertisement or place it on a package label, and even the biggest spendthrift will take notice.

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So read on—it's free.

PHILIP ANDERSON

SEEK AND YOU SHALL FIND

Search Engines

Internet surfers can choose from multiple search directories to locate just about anything. The primary benefits of World Wide Web–based search engines are twofold: They're free, and they're faster and more timely than CD-ROM and print-based Net directories and search tools. And since Web site addresses (URLs, or Universal Resource Locators) can change without notice and hundreds of new sites sprout up every week, an Internet search engine is your best bet for finding the latest information. As for the online services, each offers its own proprietary search utilities both in subject directories as well as by keyword. While free search engines have become quite robust, fee-based search tools such as Infoseek offer extras culled from Usenet newsgroups, computer magazines, technical support databases, and press releases. Fees can be per query or by subscription.

Alta Vista

ADDRESS: http://www.altavista.digital.com/

Digital Equipment claims that its Alta Vista site has the largest index of any Web search engine: some 10 billion words in over 21 million Web pages. If you need to locate an obscure company or product, or even a long-lost relative (who has a personal Web page), Alta Vista is your best choice. For instance, a search for "Jeff Bertolucci" yielded about 13 accurate matched pages, or *hits* (mostly published articles written by the coauthor of this piece). By comparison, the search engines listed below yielded no accurate hits for this query. The downside with Alta Vista is that it may return far more hits than you actually need. So if you're trying to locate a specific popular Web site, such as MTV's or IBM's, you might do better with a search engine that's less comprehensive .

Excite

ADDRESS: http://www.excite.com/

Sponsored in part by Sun Microsystems, Excite stands out because it lets you narrow your search to scan *only* Web sites, Usenet newsgroups, types of content like classified ads, or Excite's database of Web site reviews. You can also search by concept (for example, "mutual fund") or keyword ("IBM") to obtain more accurate results.

Infoseek Net Search

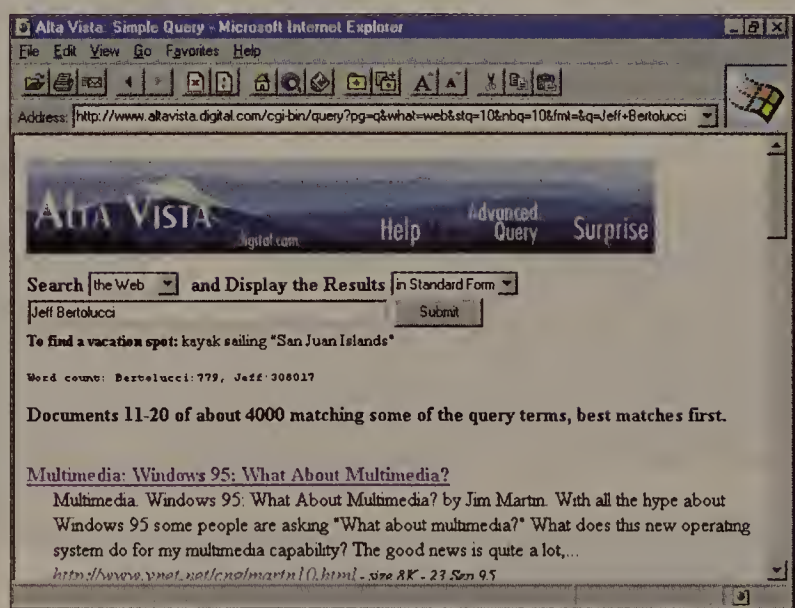
ADDRESS: http://www3.infoseek.com/

Infoseek Corporation's site offers a quick way to find popular Web pages, although it's less effective than Digital's Alta Vista at locating obscure names in lesser-known Web pages. It lets you use natural-language searches such as "find information on free CD-ROMs," as well as traditional keyword searches. The company also provides a fee-based subscription service, Infoseek Professional, that provides access to proprietary Net-based information, such as Hoover's Company Profiles and market research reports from Cambridge Scientific Abstracts' Worldwide Market Research Database.

Magellan

ADDRESS: http://magellan.mckinley.com/

Founded by a team of international publishers, technologists, and information specialists, The McKinley Group's Magellan site is an online directory of business, entertainment, reference, and other sites reviewed with attitude by the company's stable of writers. You can perform a search by keyword and, if Magellan finds the site you want, it will spit out a short, critical review of the site's content. Parents will like the Magellan Green Light icon that appears next to the names of sites that *aren't* "intended for mature audiences."



SET YOUR SITES HIGH: Alta Vista literally does just that, with 10 billion words and 21 million Web pages in its index.

SavvySearch

ADDRESS: http://www.cs.colostate.edu/~dreiling/smartform.html

When you want an intensive, all-points-bulletin search, Colorado State University's innovative tool lets you send a search query *simultaneously* to about two dozen Net-based search engines, including some listed here. The downside: Because SavvySearch queries a variety of engines, you may find yourself waiting minutes (rather than seconds) to read the results.

Yahoo

ADDRESS: http://www.yahoo.com

One of the best known Web search tools, Yahoo Corporation's self-named Web page, like Infoseek, is a fast way to locate the Web's most popular sites. For faster results (and fewer hits), you can narrow your search to specific subcategories, including Arts, Business and Economy, Entertainment, Government, and so on. Yahoo's Web Launch page lists the latest Web offerings. The simple, clutter-free interface is appealing to business users who want to find information quickly.

DIALING FOR DOLLARS

Directory Assistance

CD-ROM phone directories, like Pro CD's Business Phone, offer a quick way to track down addresses and phone numbers. Net-based phone directories are even better, since they are updated more frequently. And best of all, they're free.

The Virtual Reference Desk

ADDRESS: http://thorplus.lib.purdue.edu/reference/index.html

Purdue University's online reference library is an appropriate first stop for anyone seeking Net-based phone directories, including the AT&T Toll Free 800 Directory listed below. The Virtual Reference Desk also has links to government databases, online dictionaries, and travel services.

AT&T Toll Free 800 Directory

ADDRESS: http://att.net/index.html

Type a company's name into this site's search field, and the number pops up quickly. But since the site lists only the toll-free numbers of national AT&T 800 service customers, you won't find numbers for MCI or Sprint clients. (At press time neither MCI nor Sprint offered a similar service for its 800-number clients.) Nevertheless, the site is a helpful, easy-to-use business tool.

Dental Directory Service

ADDRESS: http://www.teeth.com

Now here's a site with byte, er, bite in it. Use the D.D.S.'s free search tool to find a dentist anywhere in the United States. Dentists provide the service with a description of themselves and the services they offer (some in their own words, with audio).

West's Legal Directory

ADDRESS: http://www.wld.com

West Publishing Company is one of the leading legal publishers in the country. Its site offers numerous services to attorneys (for a fee), but its West's Legal Directory is a free, comprehensive directory of law firms, government offices, corporate law offices, and lawyers. The highly customizable search engine lets you find a lawyer in the U.S. for your exact needs. The directory offers a résumé-like profile of each lawyer.

Legend

America Online

CompuServe

Prodigy

Road map

Download Lowdown

Before you prowl the online software libraries, here are a few pointers to simplify your downloading experience:

The faster the connection, the better.

Say good-bye to that 14.4-kbps modem. If you're not cruising cyberspace at a minimum of 28.8 kbps, you're spending too much time downloading graphics and other files—which can add to those expensive hourly online charges. Another option is a high-speed digital connection such as ISDN, but 28.8-kbps modems currently offer the best price/performance ratio.

Off hours are fastest.

You can navigate cyberspace and download files quicker by logging on during the hours that traffic is the lightest: Peak time on the commercial online services is between 5 p.m. and midnight EST. Because the Internet is global, there is no such thing as a rush hour, but you can expect busy times.

Choose the closest Internet site.

Internet-based software directories often list more than one FTP (file transfer protocol) site from which you can download a specific file. For a faster download, always choose the site that's geographically closest to you.

Scan new files for viruses.

Always use protection. Antivirus programs automatically scan downloaded files (see "Viruses: How to Perform Safe Computing").

"Anonymous access denied."

If you see this message when attempting to download a file from an FTP site, don't worry. It often means the site is busy, so try again later.

Strong supporting cast.

Downloading a file isn't enough. You'll need extraction utilities such as PKZip, a graphics viewer such as PaintShop Pro, and other tools to run your new software. You can find these helper programs in a major software library, such as Jumbo (http://www.jumbo.com). —J. B.

The Time of Your Life

What are the differences in average download times using 9600-, 14,400-, and 28,800-bps modems? To find out, we downloaded an executable file and a video clip from America Online using three modem connection speeds; each file was downloaded six times, and times were averaged. Optimum is the best time you can expect with excellent telephone lines and low network traffic. Typical is what you can more often expect in the real world.

	9600 bps		14,400 bps		28,800 bps	
File	Optimum download	Typical download	Optimum download	Typical download	Optimum download	Typical download
0.2MB PKZip	3:20	5:00	2:00	4:00	1:00	2:00
1.18MB video	22:00	32:00	16:00	20:00	10:00	13:00

Time in minutes:seconds

WWW Yellow Pages

ADDRESS: http://www.cba.uh.edu/yellowptext.html

As its name implies, this University of Houston Web page is an online directory of Web sites for corporate, government, educational, and nonprofit institutions ranging from Air Canada to the World Meteorological Organization. A no-frills interface doesn't waste your online time with flashy graphics; instead you choose from among hundreds of categories (from Aerospace to Woodworking), then click on a business's name, taking you to the company's Web site.

ABI Yellow Pages

AMERICA ONLINE KEYWORDS: abi, yellow pages

This is an excellent tool for America Online subscribers who want to find a company's address, phone number, and even basic credit rating. American Business Information's Yellow Pages contains information on millions of businesses. You can search by company or category (for example, "computer dealer") and narrow your search by including a city and state. Similar to ABI's CD-ROM product, but updated more often, the online version has more limited search options.

Pro CD Phone Book

AMERICA ONLINE KEYWORD: pro cd

Here's another useful tool for America Online users who want to find phone numbers and addresses for U.S. residences and businesses. You select a region of the country (such as "Pacific") and type in a business or personal name. You can narrow your search further by choosing a city and state. The online version, however, does not allow the handy "reverse searches" by address that its CD-ROM counterpart does.

INFORMATION IS POWER

Business Tools

You don't always need costly consultants, especially when you can get information on the Web and online service forums. Many companies offer freebies—products or resources—as bait to attract new customers. Even if they don't hook you in, you can still take advantage of their free offerings.

MarketPlace

ADDRESS: http://www.mktplace.com

At this site, MarketPlace hands over *some* of Dun and Bradstreet's valuable data. For instance, you can do a market analysis of practically any industry in the United States, obtaining detailed information that includes

Software Libraries Who's the Best?

The online realm is home to dozens of software libraries where you can find the latest freeware and shareware. We picked five of the most popular libraries and rated them on a scale of 1 to 4 floppies: a 4 is excellent; 3, good; 2, satisfactory; and 1, poor. We based our ratings on a library's quantity and quality of files, and an assessment of its file searching and downloading capabilities.

Jumbo

ADDRESS: http://www.jumbo.com

The best shareware/freeware library in cyberspace. Why? Jumbo's easy-to-use search tool helps you find what you need in the nearly 50,000 files in categories such as business, education, graphics, and games. A brief description of each file is included. The files actually reside on servers around the world; Jumbo acts like a giant switchboard to give you links to all the sites holding the particular program. Select the site closest to you for the speediest download.

Windows95.com

ADDRESS: http://www.windows95.com

Its selection of freeware isn't quite as comprehensive as Jumbo's. Nevertheless, Windows95.com is worth a visit, primarily for its innovative interface that includes Windows-style icons and a Taskbar.

WinSupport

COMPUSERVE: go windows

This is a good starting point for accessing CompuServe's vast storehouse of Windows-related software libraries. You'll find plenty of freeware, too. For instance, you can download a free trial edition of Quarterdeck's CleanSweep 95, a 32-bit Windows 95 application that uninstalls both Windows 3.*x* and Windows 95 applications. There are also free Windows 95 Web browsers such as NCSA Mosaic 2.0 and Internet Explorer 2.0.

File Search

AMERICA ONLINE KEYWORD: file search

Here's an easy way to search America Online's vast collection of software files for all available downloads, including dozens of free Windows applications and utilities. To use File Search: First load the search engine by clicking the *File Search* icon (or by typing file search in the Keyword dialog box). Next search All Categories (or specific individual categories such as Applications, Games, Windows, and so on) for the word *freeware*.

Microsoft

ADDRESS: http://www.msn.com

If you want free Microsoft software, head to the company's Web site. The Windows software library is well organized, with a separate section for downloading Microsoft Office macros, the Internet Explorer 2.0 Web browser, utilities such as the Microsoft Word Technical Dictionary, and a self-running Microsoft Office for Windows 95 demo. (Microsoft Network users should head here, too. MSN itself is sadly lacking in comparable content.) —J. B.

market share, company size, and geography. Or use the Marketing Services Directory to search for businesses by zip code—say, public relations services—and get back a list of companies located in your area.

Small Business Administration

ADDRESS: http://www.sbaonline.sba.gov/index.html

The U.S. Small Business Administration has an amazingly comprehensive Web page supplying not only a hot list of government links but also more than 500 freeware, public domain, and shareware business programs. If you're just starting out in business, check out the online Gopher site workbook, the Business Plan Road Map to Success. The site also supplies electronic Small Business Administration loan application forms, plus a ranking of commercial banks by state and lending activity.

Government Printing Office Access

ADDRESS: http://www.access.gpo.gov/index.html

Take advantage of the dazzling array of free databases available from the feds. With over a dozen Federal Depository Library gateways, this site allows keyword searches on, say, the 1995 and 1996 Federal Register and Congressional Record, Government Accounting Office reports, Privacy Act Notices, and other documents. Want to see what the government has to say about software and foreign affairs? Find out with GPO Access's Government Information Locator Service, a search engine that gets data from over 20 agencies, including the Office of Management and Budget, the Federal Trade Commission, and the Federal Communications Commission, to name a few.

Working From Home

COMPUSERVE: go work

If you work in a home office, you don't have to feel alone. You can talk online with established small- and home-office veterans who have plenty of advice. Working From Home's libraries have invaluable documents such as a checklist to help evaluate whether your home-based business is meeting your personal as well as business needs. And how about a guide to marketing your home-based business on the Internet?

HOME (PAGES) OF THE FREE

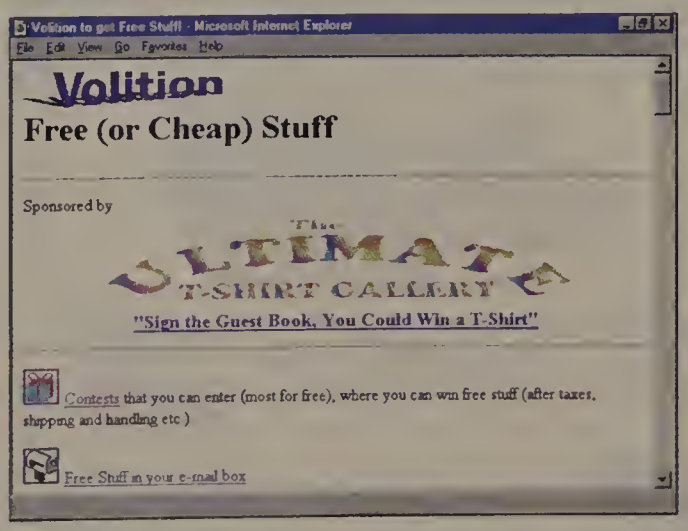
Freebie Central

What's free today may cost you tomorrow. Fortunately, a variety of Web pages and online service areas can direct you to sites offering freebies. For instance, if a computer company is giving away a 17-inch monitor, chances are you'll read about it at one of these sites. In fact, unless you have a specific site in mind, the directories below are the easiest places to begin window-shopping.

Next to Nothing

ADDRESS: http://www.winternet.com/~julie/ntn.html

Minnesota-based Julie Pederson is the ultimate freebie hound, and she likes sharing her no-cost discoveries on this directory, updated weekly. She lists freebies currently offered through toll-free numbers or at Net locations. When we last checked, there were offers for free demo software, cigars, groceries, toiletries, household cleaners, over-the-counter drugs, and myriad recipe booklets.



UP FOR GRABS: From a T-shirt to a notebook computer, you can find great prizes among Volition's contest links.

Volition

ADDRESS: http://www.volition.com/

Be sure to check out the Contests page of this freebie directory site for current listings of Internet-based sweepstakes and drawings. For instance, we found a link to Insight's home page (http://www.insight.com/web /formwin .html), where you could enter your name and mailing address for a chance to win a free IBM ThinkPad notebook. Volition also has a continuously updated list of Net-based contests where cash and other prizes are up for grabs.

Alt.Consumers.Free.Stuff: The Next Generation

ADDRESS: http://www.supernet.ab.ca/cgi-bin/freestuff

A cornucopia of freebie delights, this site provides toll-free numbers and company Web sites for a wide range of merchandise. Many of the offers, updated regularly, are culled from magazine and newspaper advertisements and are cited accordingly. When we last looked, some of the loot you could haul away included T-shirts, pet food, Excedrin, Oil of Olay, men's ties, pens, energy bars, condoms, Post-it notes, magazines, and even tickets to the Ringling Brothers and Barnum & Bailey circus.

Savetz's Unofficial Internet Public Domain Index

ADDRESS: http://www.northcoast.com/savetz/pd/pd.html

Kevin Savetz is a technology writer based in Northern California, and his Public Domain Index lists no-strings-attached literary, scientific, and engineering texts available for downloading. It also includes convenient links to other Net sites that offer free information, development tools, and other software, as well as photos and clip art—all in the public domain.

The FreeShop Online

AMERICA ONLINE KEYWORD: freeshop

Here we found a variety of free offers, including two rolls of film from Seattle Filmworks, four weeks of the *Wall Street Journal*, and a $12 rebate coupon from HBO for the

Open Sesame: Extraction Utilities

Practically every file you download is compressed, reducing the time you spend online. But before you can use those files, you'll need an extraction utility to decompress them. In fact, software libraries report that these utilities are among their most frequently downloaded files.

Utility's download file	Formats supported	Price	Availability	Comments
Drag and File Gold 95/NT dfgold.zip	.gz, .tar, .zip	$55	PC World Online	Lets you extract files by copying and moving; has built-in virus scanning.
PkZip pkz204g.exe	.zip	shareware registration $25	All online services and Internet including PC World Online	Basic DOS utility that can be used from Windows.
StuffIt sitex10.exe	.arc, .sea, .sit, .uu, .uue, .zip	free	All online services and Internet including PC World Online	StuffIt utility has Macintosh heritage; Windows version handles StuffIt .sea and .sit files as well as .zip, .arc, and Internet uuencoding.
WinZip wz60wn16.exe or winzip95.exe	.arc, .arj, .lzh, .zip	$49	All online services and Internet including PC World Online	Unarchives and installs files automatically; can preview files and launch apps without installing on hard drive.

first month of its premium cable service. Many other offers are listed here, with instructions on how to receive the freebies.

Free Offer Outlet

COMPUSERVE: go freeoutlet

In addition to the Seattle Filmworks offer listed above, at the Free Offer Outlet we found such bonanzas as a sample tube of Rembrandt Oral Care toothpaste, a full working version of PC Planner, a desktop organizer program, and sample issues of magazines such as *Popular Science*. Search by offer, business, or in any of 28 product categories.

The Free Offer Store

PRODIGY: jump free

Prodigy's Free Offer Store includes many of the same deals you'll find in the free offer areas of the other online services, including Seattle Filmworks' film offer, magazine issues, and a booklet for managing your budget when you place an order with Current Checks, a check printer.

FreeRide

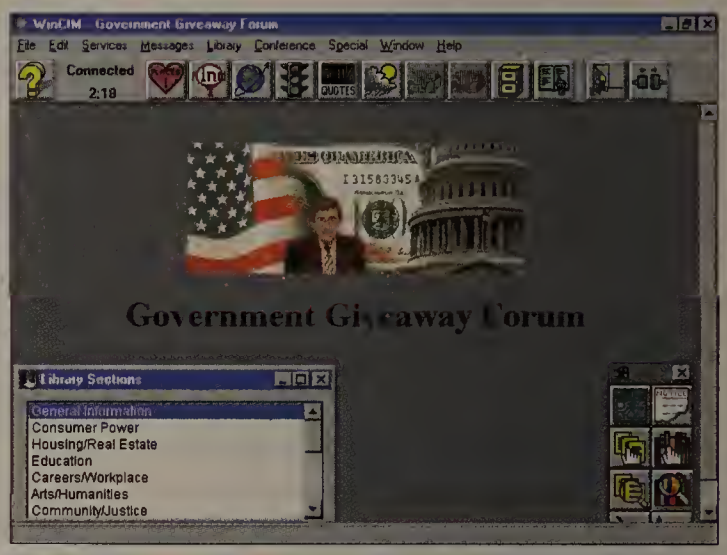
ADDRESS: http://www.freeride.com

FreeRide offers the nineties version of redeemable Green Stamps with its novel concept: Get free Internet time in exchange for buying consumer products such as a box of cereal or an audio CD. Purchase any of the products on the FreeRide "menu" and you get time credits applied to your Internet service provider or online service of your choice. You simply save the proofs of purchase from the products and send them to FreeRide, which then issues your online provider a credit statement that shows how much time you've earned. The service is free to end users, and the selection of products is extensive.

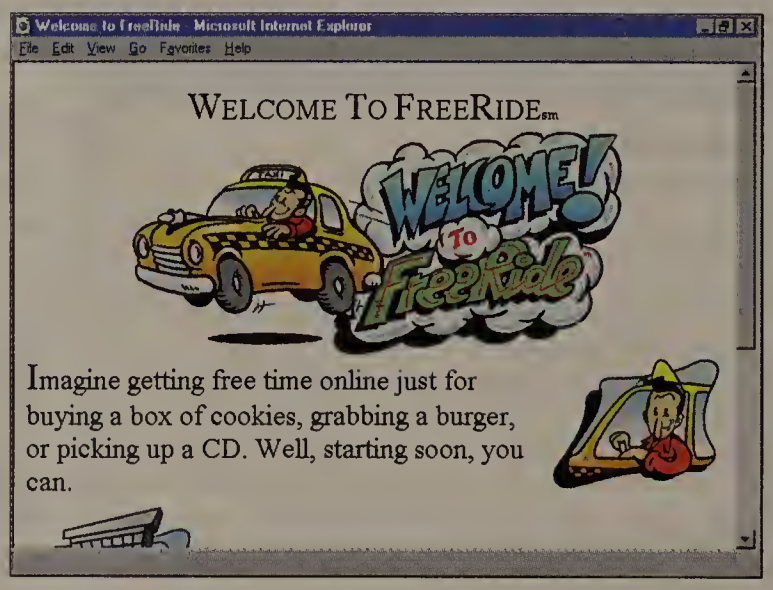
Government Giveaway Forum

COMPUSERVE: go infousa

Author and freebie maven Matthew Lesko shows you where to locate free services and products offered by the U.S. government. You'll find such gems as free consulting services for entrepreneurs and inventors, plus government pamphlets on how to start your own business. If you must download only one file from this forum, we recommend—as does Lesko himself—g1001.txt, which shows the types of information and services available from the folks in Washington.



COME AND GET IT: The Federal Government offers hundreds of free services and products–find them here.



SAVE YOUR PROOFS OF PURCHASE from consumer products and restaurant meals to get time online from FreeRide.

Free Web Sites for Small Businesses

AMERICA ONLINE KEYWORD: web diner

Create a Web site for free! America Online allots 2 megabytes of disk space per screen name for users to create a Web page at no additional charge. Since AOL allows five screen names for every member's account, a small business owner can gang the accounts together to get 10MB of disk space. (CompuServe offers just a megabyte or two for personal use, as does Prodigy.)

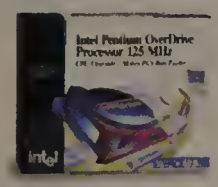
LottoWorld

ADDRESS: http://lottoworldmagazine.com/h_006.html

Tired of buying lotto tickets? Enter to win *LottoWorld Magazine*'s Ticket Sweepstakes. The lucky winner gets 10,000 lottery tickets—and there's bound to be a winner in there somewhere. To enter, simply fill out

Introducing more kick for your Pentium® processor-based PC.

Upgrade your Pentium® processor-based PC with a Pentium OverDrive® processor.



The new Pentium OverDrive processor is an easy-to-install, single-chip CPU upgrade that gives you a performance increase of over 50% on a wide range of business software†. Like spreadsheets and presentation graphics, or operating systems like Windows*95.

Pentium OverDrive processors are now available for 60, 66, and 75 MHz Pentium processor-based PCs and, as always, for most Intel486™ processor-based PCs. All affordably priced.

So if more performance is your ultimate goal, call your local dealer or call FaxBack* at 1-800-525-3019, doc. #8739 for pricing and availability information. Or visit our Web site at **http://www.intel.com/procs/ovrdrive/.**

PROUD PARTNER

intel®

150 1846–1996 Smithsonian

© 1996 Intel Corporation. †Based on upgrading a 60 MHz Pentium® processor-based PC with a 120 MHz Pentium OverDrive® processor running a range of 16-bit productivity applications. *All other brand names are trademarks of their respective owners.

Viruses How to Perform Safe Computing

If you're going to pick up a data-destroying computer virus, it'll probably come from a file you download from cyberspace. So you need protection before disaster strikes.

One top antivirus choice is F-Prot Professional—it's fast, accurate, and free. F-Prot runs from DOS or Windows and intercepts viruses before they wreak havoc. Get your copy at http://www.datafellows.fi/f-prot.htm.

McAfee's VirusScan quickly scours your files while you're busy with other computing tasks. It comes in versions for Windows 3.1, 95, and NT; OS/2; and DOS. Find it at http://www.mcafee.com and on most BBSes. Registration is $65.

If you receive lots of e-mail, you should consider Touchstone's PC-cillin '95 (which includes a version for Windows 3.1). Not only does the $49 PC-cillin handle routine virus chores, it also checks for viruses as you download compressed files onto your hard disk, and it scans files attached to e-mail messages. Look for more information on the firm's home page (http://www.antivirus.com). —S. B.

LottoWorld's sweepstakes entry form. Drawings will be held June 1 and December 1, 1996. You must be at least 18 years old to enter. The string attached to this is that they capture your name and address, which they can then sell to other marketers.

CAREERS FROM YOUR DESKTOP

Job Hunting

The Web is your best bet for free up-to-date career information and job listings—ones that might appear in newspaper classifieds and others usually only posted internally at companies. While there are dozens of career sites on the Net, here are four favorites.

The Business Job Finder

ADDRESS: http://www.cob.ohiostate.edu/dept/fin/osujobs.htm

Maintained by Ohio State University's Fisher College of Business, The Business Job Finder offers information on careers in such fields as finance, banking, real estate, accounting, and management. The commercial banking section, for instance, lists skill requirements, banking trends, salaries, and top banks in the U.S., along with relevant contact information. And like any resourceful site, this one also conveniently includes links to other career-related Web sites.

CareerPath.com

ADDRESS: http://www.careerpath.com/

You don't need to buy a newspaper to check out the job classifieds. This site lets you search classified employment ads from six participating newspapers: the *Boston Globe*, *Chicago Tribune*, *Los Angeles Times*, *New York Times*, *San Jose Mercury News*, and *Washington Post*. Enter a job type to see listings frequently posted before the printed version reaches the streets. The service would be of limited value to anyone interested in jobs outside of the regions covered.

E-Span

ADDRESS: http://www.espan.com/

Sporting perhaps the most practical interface of all the career-oriented Web sites we looked at, E-Span guides you through an interview process to gauge your professional interests, salary requirements, years of relevant experience, and so on. It then searches its database for U.S. job openings most appropriate for you. We were able to find dozens of corporate job listings in categories such as sales, marketing, management, and engineering. You'll also find company profiles, salary guides, and advice on how to create both electronic and paper résumés. E-Span also has a similar forum on CompuServe (go career).

The Internet's Online Career Center

ADDRESS: http://www.occ.com/occ/

The clean, no-frills interface is perfect for career seekers who want to find the right job *fast*. When you log onto the Online Career Center's home page, you'll find a handy search tool for locating job openings by industry, state, and city. You can also e-mail your résumé to the OCC, which will post it in its résumé bank where it can be seen by corporate recruiters.

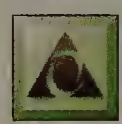
THE READING ROOM

Books and Pamphlets

While you probably won't find copies of the latest Anne Rice or John Grisham bestseller (well, not legally, anyway), online services and the Net are a good source of reference and public domain texts.

Barron's Booknotes

AMERICA ONLINE KEYWORD: booknotes



Okay, so maybe you've been out of school for years, but you probably know someone who will want to check out this AOL site. Barron's lets you download its *Barron's Booknotes*, the popular crib guides to great works of literature such as *Anna Karenina*, *Hamlet*, *A Farewell to Arms*, and scores of other books you were forced to read in high school or college. This is the place to go for a condensed education.

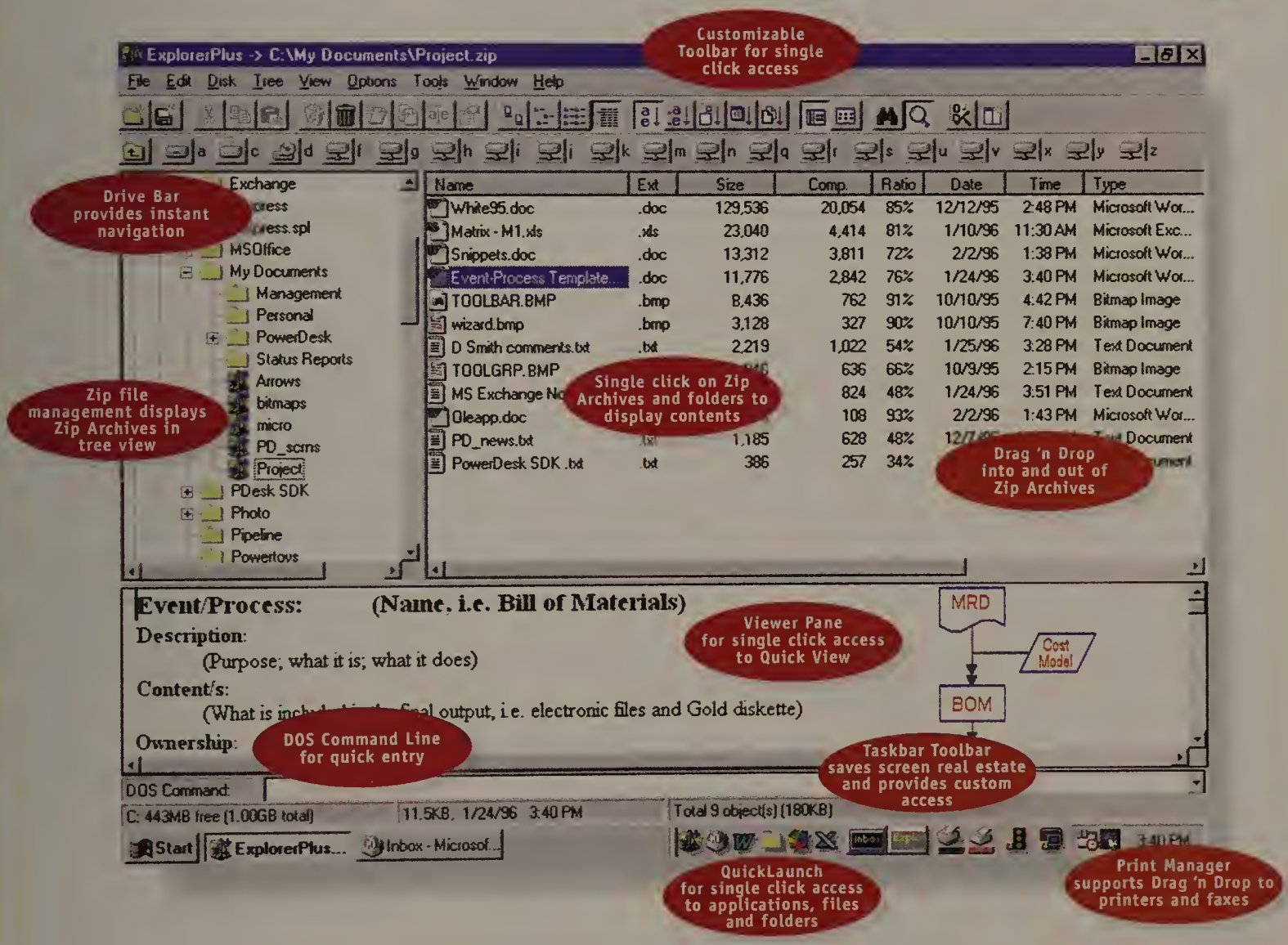
The On-Line Books Page

ADDRESS: http://www.cs.cmu.edu/Web/books.html

Carnegie Mellon University's Books Page provides the text of over 1300 books free for personal, noncommercial use, including literary classics such as *The Importance of Being Earnest* by Oscar Wilde. While many titles are a tad esoteric, like E.T. Jaynes' *The Physical Basis of Music*, bibliophiles everywhere will find the Books Page worth a visit.

"PowerDesk: What Explorer and Dashboard Should Have Been"

— *PC Magazine* February 20, 1996

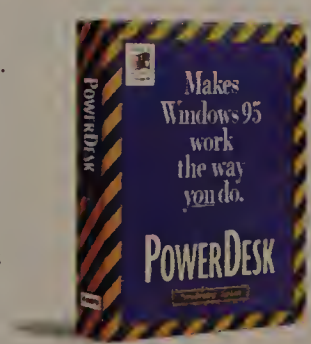


PowerDesk.™ The highly-acclaimed file management and desktop enhancement utility that truly unleashes the hidden power of Windows® 95.

With ExplorerPlus™ (a beefed-up version of the Windows 95 Explorer) and the user-defined PowerDesk Toolbar, you'll have everything at your fingertips. Imagine that, immediate access and a place for everything. Very smart. Very fast. Very flexible.

Simply put, PowerDesk makes your file manager and desktop work the way *you* do.

You could call PowerDesk the world's coolest Windows 95 enhancement utility. Which, as you can see, is exactly what people are saying.



1-800-922-3383

Available at your local software store.
Visit our Web site for a free PowerDesk demo copy.
MicroHelp is at www.microhelp.com

©1996 MicroHelp, Inc. All rights reserved. PowerDesk and ExplorerPlus are trademarks of MicroHelp, Inc. Windows is a registered trademark of Microsoft. Explorer and Dashboard are trademarks of their respective owners. Quote reprinted from PC Magazine, February 20, 1996. ©1996 Ziff-Davis Pub. Co.

MicroHelp

HEY, EVERYONE CAN USE A LITTLE HELP.

Circle 150 on reader service card

Kaplan Online–Virtual Campus

AMERICA ONLINE KEYWORD: Kaplan

Download free admissions guides to major U.S. universities and graduate, business, and law schools. The Kaplan electronic guides are lengthy (the one covering U.S. colleges is about 60 pages long), and these are just excerpts from Kaplan's line of college admissions guidebooks.

HIGH-FLYING DEALS

Travel

Does your travel agent really find the lowest fares? Can you ever spot the best restaurant in a new town? Do-it-yourselfers might want to go online to make their plans—and discover some perks in the process.

Kerry's Restaurant World

ADDRESS: http://www.kerrymenu.com

Kerry Tracy boasts that this site features the largest selection of menus and photos from top restaurants across the country. While we can't corroborate that, we can recommend the site for dispensing information that had been available only in guidebooks, many of which are updated only once a year. Tracy adds material daily, including restaurant openings and a calendar of events. He started Kerry Publishing with the Kerry Calendar, an appointment book that includes menus for New York's top restaurants.

United Connection

COMPUSERVE: go united

You can earn 500 Mileage Plus miles every time you make a visit to CompuServe's United Connection forum to purchase a ticket. You must complete a round-trip flight on United Airlines, Shuttle by United, or United Express. A trip must be at least 250 miles per segment, or 500 miles round-trip. Updated information on United schedules and your Mileage Plus account is also available here.

WebFlyer

ADDRESS: http://www.webflyer.com

You'll find a weekly drawing for 500 frequent flyer miles, courtesy of the frequent flyer program journal *InsideFlyer Magazine*. You can also read the magazine's ratings of the nation's most popular frequent flyer programs. How does your airline rate? Links to other airline and air travel sites are conveniently offered here plus such useful information as airport maps, special travel offers, and travel news. The magazine also maintains a similar site on America Online (keyword insideflyer).

MapQuest

ADDRESS: http://www.mapquest.com

Geosystems' unique interactive online atlas lets you locate businesses, places of interest, entertainment and event locations, and travel resources across the United States with continuously updated maps that are detailed right down to the street level. The company is a supplier of geographic information to publishers. MapQuest's powerful search engine maps the location of your query and offers corresponding or applicable hot links for more information.

More Online

The full text of this article can be found on PC World Online (http://www.pcworld.com). We've included hot links to all Web addresses you see here. The forums noted for America Online, CompuServe, and Prodigy can be accessed from each service.

COMPUTER CONNECTION

Help With Your PC

Asssuming that your computer is healthy enough to get you online, you can try these Web sites for answers to all questions digital.

Free Computer Help

ADDRESS: http://users.aol.com/balfer/help.htm

Free help via e-mail? Naturally, we were skeptical, but the site proved us wrong. We received an answer to the question "What is a freenet?" within 48 hours—with an *apology* for the late response! It's run as a customer lure by Balfer Reference Guides, which also sells a $24 guide that contains answers to the most frequently asked questions about computing problems.

Free Online Dictionary of Computing

ADDRESS: http://wfn-shop.princeton.edu/cgibin/foldoc?bg=on&action=Home&query=

If you've ever wondered what the term *archie* means or wanted a clear explanation of *anonymous FTP*, then point your Web browser to this online computing dictionary—a fast way to learn the true meaning of all those techno terms. The dictionary contains over 7900 concise definitions written in easy-to-understand language.

HelpWin95

ADDRESS: http://www.helpwin95.com

Billed as "the complete source for online information and software tools for making your upgrade to Windows 95 a productive and pleasurable experience," it is chock-full of free interactive Win 95 tutorials; working versions of Win 95 apps, utilities, games, and drivers; and links to sites with free software and Microsoft's tech support. It's run by HelpWin95, a mail order company that offers the freebies as a lure to get you to buy Windows 95 products from its online catalog.

Steve Bass is a PC World *contributing editor. Jeff Bertolucci is a Denver-based freelance writer. Neither wrote this for free.*

Tomorrow's Technology Today!

THE MICRON

Unleashing up to 166MHz of Pentium® processor power, the Micron Millennia blows past established benchmarks into a whole new universe of unbridled computing performance. Continuing to triumphantly sweep the PC industry's most coveted awards, the Micron Millennia line was recently recognized with *PC Magazine*'s "Best Products Of 1995" award.

The Millennia series, legendary for blistering speed and outstanding value, will handle the most challenging applications—right now! So if your style is to work hard and fast, the Micron Millennia is designed just for you.

January 9, 1996
MILLENNIA

MILLENNIA P150

- Intel 150MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- 6X EIDE CD-ROM drive, 3.5" floppy drive
- SoundBlaster™ 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD & MS Plus! CD
- 5-year/3-year Micron Power℠ warranty*

A • 8MB EDO RAM • 1.0GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
• Microsoft Works 95 CD
$2,199 Business lease $75/month

B • 16MB EDO RAM • 1.6GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs
$2,599 Business lease $88/month

C • 32MB EDO RAM • 2.1GB EIDE hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
• Microsoft Office Pro 95 & Bookshelf 95 CDs
$3,399 Business lease $116/month

- With 166MHz Pentium processor.....add $200
- With 133MHz Pentium processor.....subtract $100

MILLENNIA PLUS P166

- Intel 166MHz Pentium processor
- 256K pipelined burst cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 CD & MS Plus! CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power℠ warranty*

A • 16MB EDO RAM • 1.0GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$3,099 Business lease $105/month

B • 32MB EDO RAM • 2.0GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$3,899 Business lease $133/month

C • 64MB EDO RAM • 4.0GB Fast SCSI-2 hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
$5,499 Business lease $173/month

- With 150MHz Pentium processor.....subtract $200

MILLENNIA

Micron computers are winning critical acclaim for their exceptional quality, record-breaking speeds, dependable performance and outstanding customer service and support. Recognized regularly for technical excellence and for customer service and technical support, Micron computers have been chosen for *PC Magazine*'s "Best Products of 1995" and "Editor's Choice" five times, *PC World*'s "Best Buy" over 40 times, *PC Computing*'s 1995 MVP award and *Computer Shopper*'s "Best Buy of 1995." Micron received the highest scores in *PC Magazine*'s 1995 Service and Reliability survey in the four categories of "Customer Satisfaction with Reliability," "Repair Experience," "Technical Support" and "Future Likelihood of Buying Again."

PC MAGAZINE EDITORS' CHOICE

EXPERTS' Windows SOURCES PICK

PC WORLD BEST BUY

HIGHLY '95 C CADalyst RECOMMENDED

SERVICE & RELIABILITY PC MAGAZINE READERS' CHOICE

PC MAGAZINE EDITORS' CHOICE

May 30, 1995
MILLENNIA P120

"The Millennia is nothing short of the best all-around PC available on the market today."

—*PC Magazine, April 25, 1995*

MVP WINNER PC Computing

December 1995
MILLENNIA P133

"...we tested the latest PCs until they begged for mercy and found a no-compromise choice: Micron's Millennia P133."

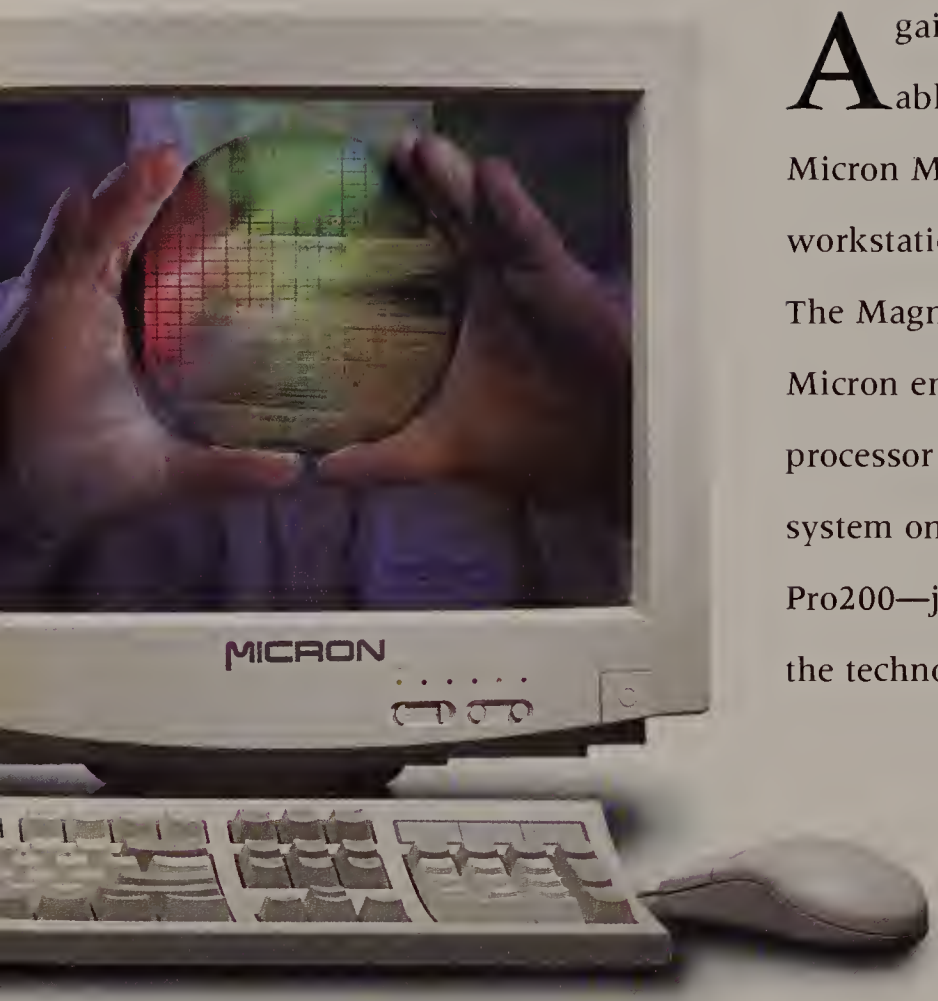
—*PC Computing, December 1995*

800-223-6571

http://www.mei.micron.com

MICRON ELECTRONICS, INC.

PRO MAGNUM



Again, Micron leads the industry by making affordable workstation performance a reality. The new Micron Magnum Plus Pro200 expands the limits of a workstation with the most advanced components available. The Magnum Plus Pro200 system combines superior Micron engineering with Intel's advanced Pentium® Pro processor and Windows® NT for the fastest, most reliable system on the market today. The Micron Magnum Plus Pro200—just what you'd expect from Micron Electronics, the technology leader.

MAGNUM PRO150

- Intel 150MHz Pentium Pro processor
- 256K internal cache, flash BIOS
- 6X EIDE CD-ROM drive, 3.5" floppy drive
- SoundBlaster™ 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power℠ warranty*

A • 16MB RAM • 1.0GB EIDE hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$2,999 Business lease $102/month

B • 32MB RAM • 1.6GB EIDE hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
$3,799 Business lease $129/month

- With 180MHz Pentium Pro processor.....add $200
- With 200MHz Pentium Pro processor.....add $400

MICROSOFT WINDOWS NT READY-TO-RUN

intel inside PENTIUM PRO PROCESSOR

MAGNUM PLUS PRO200

- Intel 200MHz Pentium Pro processor
- 256K internal cache, flash BIOS
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- SoundBlaster 16 stereo sound & speakers
- PCI 64-bit video, MPEG, 2MB EDO
- *Tool-free* mini-tower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows NT Workstation 3.51 CD
- Microsoft Office Pro 95 & Bookshelf 95 CDs
- 5-year/3-year Micron Power warranty*

A • 32MB RAM • 2GB Fast SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$4,599 Business lease $156/month

B • 64MB RAM • 4GB Fast SCSI-2 hard drive
• 17" Micron 17FGx, .26dp (15.8" display)
$6,199 Business lease $195/month

C • 128MB RAM • 9GB Fast SCSI-2 hard drive
• 21" Micron 21FGx, .26dp (20.0" display)
$10,399 Business lease $320/month

800-223-6571

http://www.mei.micron.com

MICRON ELECTRONICS, INC.

AWARD-WINNING SYSTEMS

SERVERS

POWERSERVER SMP P133

- Intel 133MHz Pentium® processor
- Dual Pentium SMP ZIF sockets
- 512K write-back cache, flash BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
- Full-size tower with 10 drive bays
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 CD & MS Plus! CD
- 5-year/3-year Micron Power℠ warranty*

A • 16MB RAM • 1GB SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$2,999 Business lease $102/month

B • 32MB RAM • 2GB SCSI-2 hard drive
• 15" Micron 15FGx, .28dp (13.7" display)
$3,799 Business lease $129/month

- With second 133MHz Pentium processor....add $499
- With Windows NT Workstation 3.51 CD.....add $99

POWERSERVER SMP P266

- Dual 133MHz Pentium processors
- 512K write-back cache, flash BIOS
- Slots: 5 EISA, 2 PCI, 1 EISA/PCI
- PCI 32-bit Ultra SCSI Fast-20 controller
- 6X SCSI-2 CD-ROM drive, 3.5" floppy drive
- PCI 64-bit video, MPEG, 2MB EDO
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- Microsoft Office 95 & Bookshelf 95 CDs
- Microsoft Home Pak includes: Works 4.0 for Windows 95; Publisher Deluxe for Windows 95; Encarta 96; Encarta 96 World Atlas; Music Central 96; Wine Guide; Arcade 1.0; Scenes–Sports Extremes Collection; Cinemania 96; Julia Child Home Cooking; Best of Windows Entertainment Pack; Money 4.0 for Windows 95; CD Sampler (includes Fury³ game demo)
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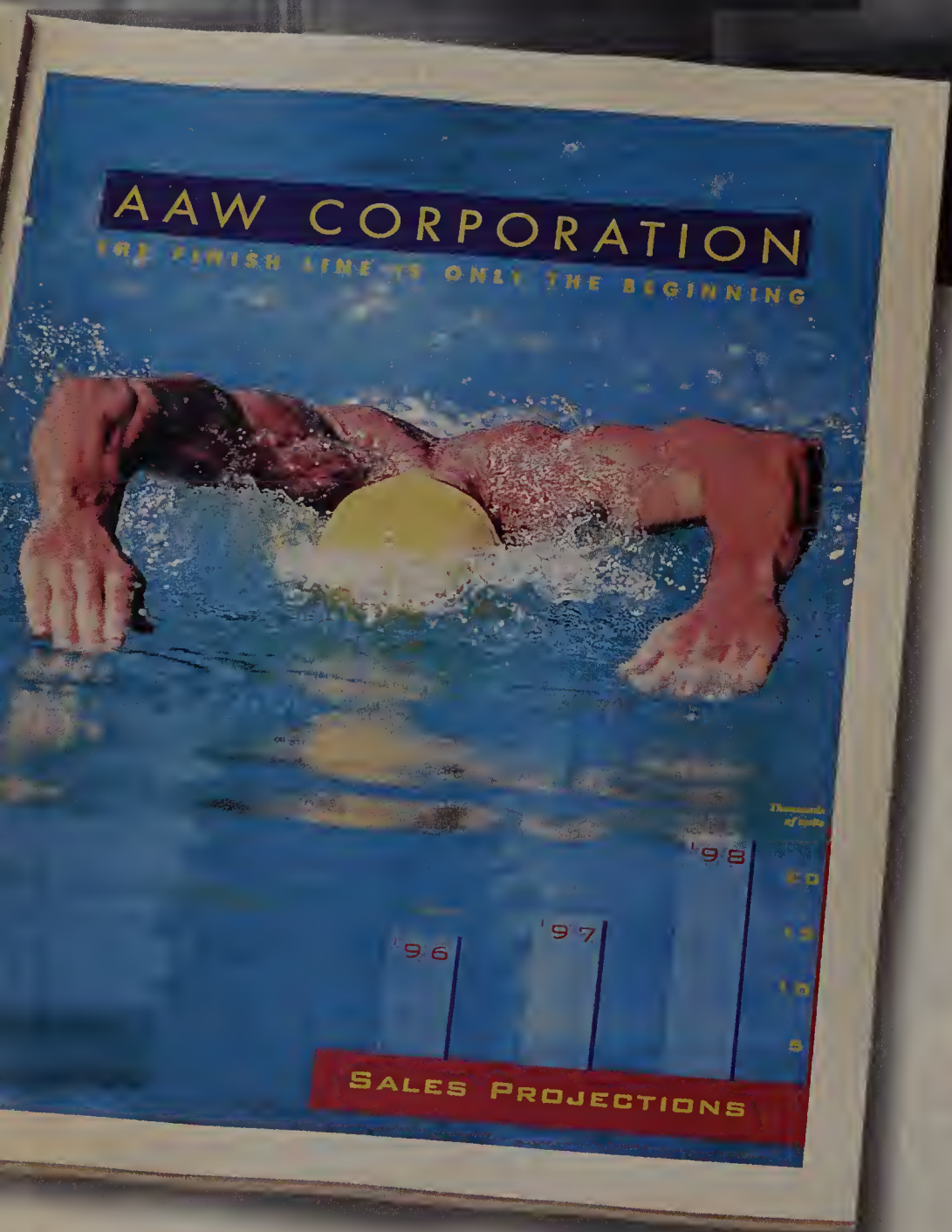

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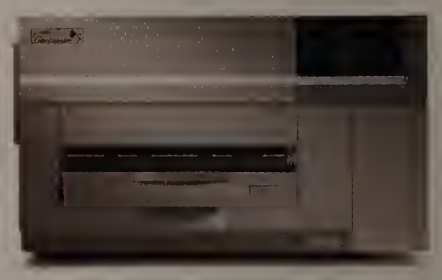

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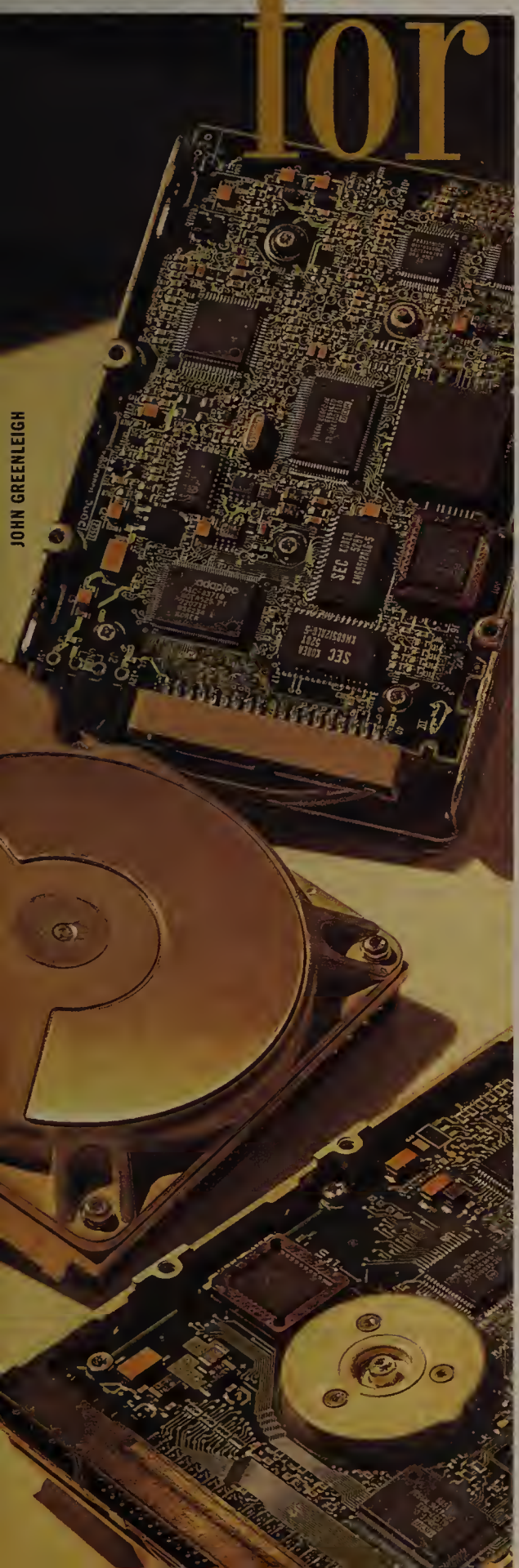


JOHN GREENLEIGH

BELIEVE IT. WITH PRICES SO LOW, UPGRADING YOUR PC'S STORAGE IS A NO-BRAINER. HERE'S YOUR GUIDE TO 70 DRIVES WITH CAPACITIES FROM 1 TO 9 GIGABYTES.

BY REX FARRANCE AND ARDEN HOFFMAN

It's hard enough keeping up with your workload without having to sit through another remake of *The Incredible Shrinking Hard Drive*. Of course, your drive only *seems* to be getting smaller—it's all those bigger programs and files that are cramping your style.

Operating systems, applications, and files haven't trimmed down any since our last comprehensive look at hard drives a little over a year ago. At that time, 1GB hard drives were considered big—now a 1GB drive is really the minimum we can recommend. For instance, full installations of a popular combo, Microsoft's Windows 95, Plus, and Office 95 Professional, lock up about 200MB. Add to that room for today's multimedia and graphics applications (10 minutes of MPEG video can easily take 100MB or more), plus all the neat stuff you can download from the World Wide Web, and you'll be hurting for space. And Windows 95's dynamic disk-based virtual memory also needs plenty of free disk space—or you won't be able to load additional programs once your system RAM is full.

If you're in the market for a new PC, you probably don't have to worry too much about having enough storage: Hard drives of 1GB and larger are standard fare today on most of our Top 20 desktop PCs. But what if the 540MB hard drive on your two-year-old Pentium or DX4 is pinching you tighter than a new pair of shoes? You have three choices: You can replace your current hard drive, add a second hard drive, or add a removable-media drive, such as Iomega's new Jaz SCSI drive, which costs about $500 plus $99 for additional 1GB media (see this month's *Hardware Q&A* and "Incredible Expanding Drives" in March).

For most computer users, the best bet is to go with a conventional hard drive. Fortunately, hard disks are cheaper than ever. For example, 1275MB IDE drives are being advertised for around $250 (about 20 cents a megabyte), approximately half of what they cost last year. The biggest hard drives are around 9100MB—more than twice the size they were 12 months ago. Even *their* prices are quite reasonable: For example, the 9090MB Seagate Elite 9 is advertised for $2299 or about 25 cents a

megabyte. And a new hard drive won't just expand your PC's capacity. If you hook the drive up to a PCI or VESA local bus adapter, it should also improve your computer's performance. If your PC lacks a local bus connector, you might get a speed boost, but you won't be able to take advantage of your drive's fastest transfer rate.

Quantum's Bigfoot dwarfs its sibling, the Fireball 1280, but shares a bay with most CD-ROM drives.

For this guide, we gathered specifications on 70 internal hard drives ranging in size from 1080MB to 2560MB for IDE drives and from 2200MB to 9100MB for high-performance SCSI drives. Prices run from $199 to $2299. Almost all the drives here will fit in a 3½-inch bay, with a sprinkling of 5¼-inch form factor products in the mix.

For in-depth speed tests and hands-on evaluations, we chose ten representative units from Conner, Fujitsu, Hewlett-Packard, Seagate, Quantum, and Western Digital. (Conner was acquired by Seagate while our review was in process. As a result, the two Conner drives we tested are now listed and sold as Seagate Cabo drives.) We installed each drive in our year-old Micron P90 Millennia, hooking up the IDE units to the integrated PCI adapter and the SCSI drives to an AdvanSys AdvanSCSI ABP-930 bus-mastering PCI adapter. To test speed, we performed tasks in several Windows 3.1 and Windows 95 business and graphics applications.

Different Strokes...

What did we find? The kind of hard drive you should buy depends on what you'll use it for: Our tests show that for typical business applications—word processing and spreadsheet programs—IDE drives, which are standard in most new PCs, provide the most attractive combination of low price, good capacity, and solid performance. The latest generation of IDE drives (sold variously as Enhanced IDE or Fast-ATA-2, depending on the vendor) are rated to transfer short bursts of data at rates as fast as 16.7MB per second, and the fastest IDE drives we tested—the Seagate Medalist 2140 and the Quantum Fireball 1280—compared favorably to even the fastest among the SCSI drives in all except the difficult Adobe Photoshop test. Granted, they aren't as flexible as SCSI drives (only two can be connected to each adapter), but they'll plug right into your current local bus drive adapter.

SCSI hard drives are more expensive than IDE units—costing about $50 or more extra per gigabyte, plus another $100 to $300 for a SCSI adapter—and they offer little or no performance advantage for the most common applications. But they're perfect for more demanding jobs, such as disk-intense graphics work, server-based storage, large databases, and desktop publishing. Even in less demanding applications using Windows 95, a SCSI drive,

How to Find Your Best Deal

Prices can vary quite a bit depending on where you buy. Computer superstores and membership warehouses generally offer attractive deals, but the lowest prices often come from mail-order firms and some local dealers. Before buying make sure the drive has a valid manufacturer's warranty—retail kits can have different warranties from drives sold to system integrators. Also, if buying a new system, don't assume the drive has a longer warranty than the PC. The typical warranty on an end-user IDE drive is 3 years, and most SCSI products come with a 5-year warranty. You'll also want to ask how warranty service is handled. Many vendors will immediately send you a replacement, and HP touts its 24-hour Express Exchange service for a failed drive.

You probably already have an IDE adapter in your PC, but remember that you'll need to buy an adapter to use with the SCSI drives. And make sure you have the right kind of cable, mounting hardware, and installation instructions. If you're adding rather than replacing a drive, you must have a 3½-inch internal bay for most drives. The new ¾-inch-high Quantum Bigfoot 5¼ inch form factor models are a rarity: They're designed to work in the same bay with most CD-ROM drives.

Specs Meet Specsmanship

Manufacturers love to quote numbers, but real-world performance varies widely, so it's best to take all of them with a grain of salt. Here are some plain-English explanations.

Average seek The average milliseconds it takes a drive's heads to find requested data.

Cache on drive A hard drive's cache or buffer ranges from as little as 64K to as much as 2048K on the drives covered here. All the drives can cache both reads and writes. The jury is out on how much effect on-disk cache has on performance in the desktop environment, where software caching is almost always in play. Our tests show no direct correlation between cache size and performance.

Contact start-stop cycles (CSS) The manufacturer's prediction of the number of times you can expect to start up the drive before the heads may damage the disk platters.

Fibre channel Fast SCSI-3 drives that use a serial, rather than parallel, interface.

G shock rating Pay attention to this spec if you live in earthquake country. It tells you how well the drive should take a jolt; higher should indicate more shock resistance.

Multiword DMA Direct Memory Access, or DMA, is another way to let IDE drives transfer data to system RAM without CPU intervention; multiword DMA allows more data to be transferred at once.

SMART-compliant A so-called SMART-compliant drive can predict impending failure and send a warning message to the system.

such as the 2140MB HP SureStore 2000LP SCSI-2 drive that aced our toughest tests, should still boost your productivity if you work regularly with multimegabyte files or do complex multitasking. And even with transfer rates as high as 20MB per second, SCSI-2 isn't the top of the food chain: The new Ultra SCSI standard allows for transfer rates up to 40MB per second, and fibre channel, the fastest type of SCSI, is spec'd at an amazing 100MB per second.

SCSI drives are better than IDE drives for heavy workloads because they tend to run at higher rpms—the single most important factor in performance—and have larger on-disk buffers. SCSI drives have faster seek times and can read and write data more quickly. You can further improve SCSI performance in intense multitasking environments, such as a busy server or a Windows 95 system executing multiple programs and tasks, by using a bus-mastering adapter. These more advanced adapters relieve the CPU of most of the work of controlling reads and writes, thus enabling a significant edge in overall speed. Desktop SCSI cards have the added advantage of allowing you to hook up as many as seven drives to each adapter for extra storage.

As a group, the four SCSI hard drives we tested won the performance race by a mere

Tips for Hard Drive Upgrades

Dump Your Old Drive Don't try to salvage a small, slow, tired drive. Difficulties hooking two dissimilar drives together are common.

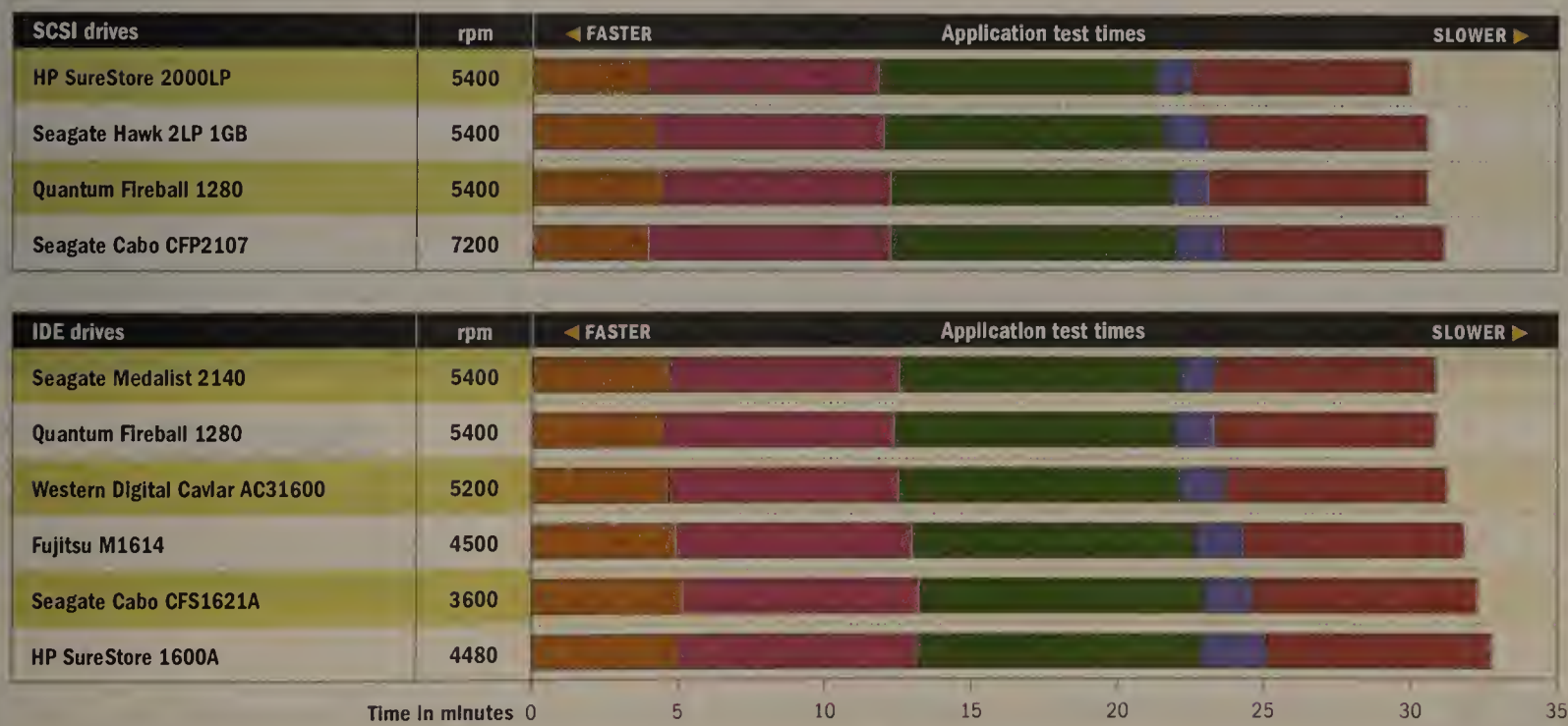
Brand Loyalty Pays If you're hooking two IDE drives together as master-slave, purchase the same brand: It's your best bet to make sure the two drives will work together.

Surf the Web for Drive Info Most drive manufacturers have World Wide Web and BBS sites where you can quickly track down drive specs, jumper settings, cable types, and the like—a great resource for after-hours problems.

Check Your BIOS If your PC is more than a year old, ask your system vendor if your BIOS supports current IDE drives. If not, you'll either need to upgrade your BIOS or make sure your new drive comes with a utility that allows access to partitions larger than 528MB. For ISA installations, a $39 adapter from GSI offers automatic configuration and needs no software drivers (800/486-7800).

Set Up Your Big Drive to Save Space Using just one drive letter (or partition), can waste 100MB or more per gigabyte. However, if you use more than one drive letter, setting partitions below 1024MB, then the size of each file cluster drops from 32K to 16K. That can save 16K every time you store a small file.

TEST REPORT SCSI Drives Faster on Photoshop and Picture Publisher



Hard drives are arranged in order of overall performance from best to worst.

Methodology Each drive was installed according to the manufacturer's instructions in a 90-MHz Pentium PC with 16MB of RAM and 256K of secondary cache.

Photoshop 3.0 We opened, manipulated, and saved a 16MB PSD file.

Paradox 5.0 for Windows We simulated a compound order entry system.

Excel 7.0 for Windows 95 We performed financial and statistical operations.

Picture Publisher 6.0 for Windows 95 We edited numerous pictures with masks, inversion, tinting, cutting, texture, text, and special effects.

Word 7.0 for Windows 95 multitasking We launched a background file transfer using Procomm Plus 2.0 while executing common Word 7.0 functions in the foreground.

Data based on tests designed and conducted by the PC World Test Center.
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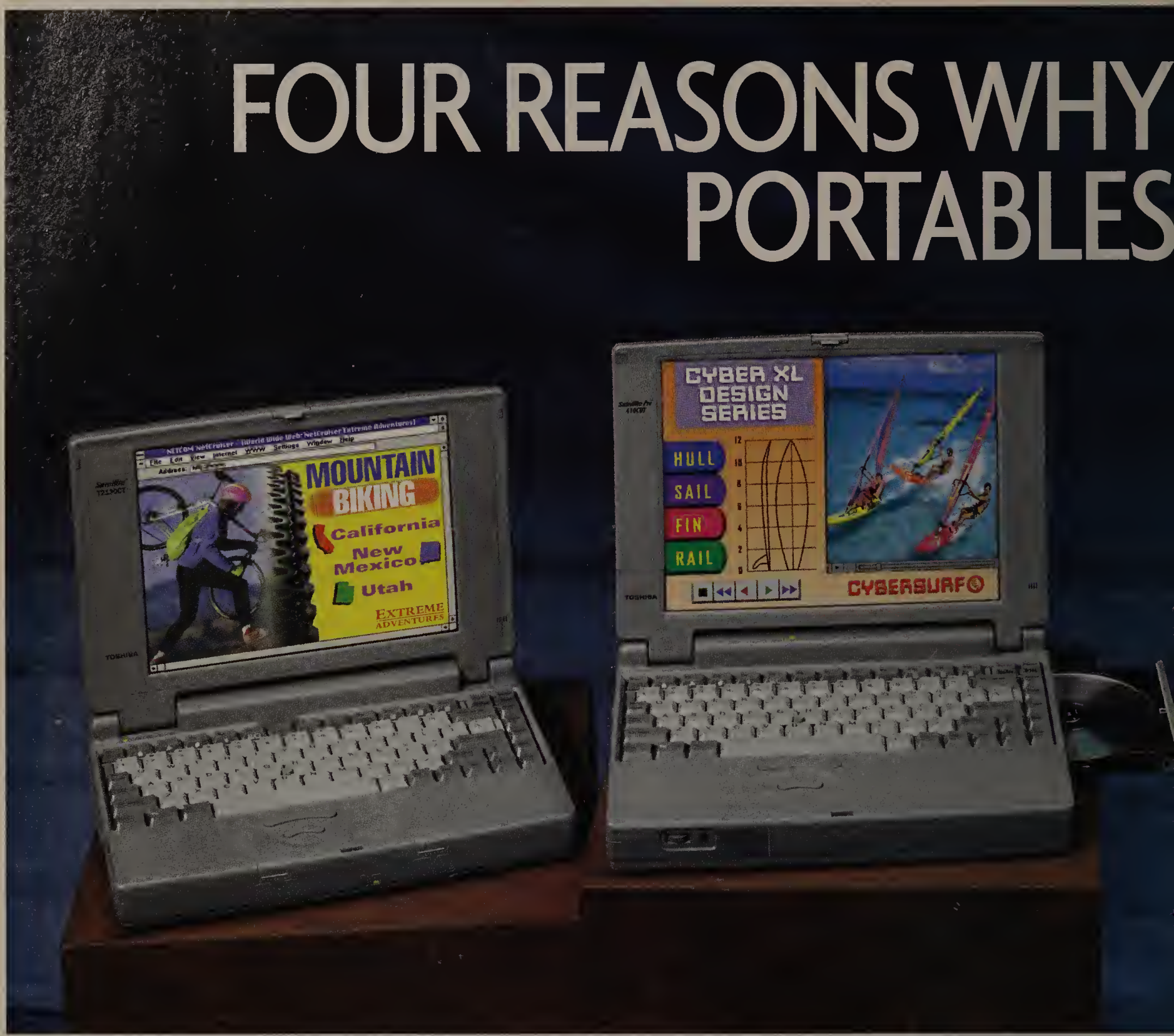

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4 percent over their six IDE rivals. In the Word 7.0, Excel 7.0, and Paradox tests, even the fastest drives were unable to gain a significant advantage over their slowest competitors. But as the tests got harder, the SCSI units picked up the pace. On our two most disk-intensive tests, using Photoshop and Picture Publisher, the SCSI drives beat the IDE devices by 15 percent. Rpms were also a differentiator on these tests: For example, the pace-setting HP SureStore-2000LP SCSI drive and the 2113MB Seagate Medalist 2140 IDE drive, which both spin at 5400 rpm, were noticeably faster than the other drives on the Picture Publisher test and almost twice as fast as the slowest IDE drive (the 4480-rpm HP SureStore 1600A). Ironically, the 2147MB Seagate Cabo CFP2107 SCSI drive took about 40 percent longer on this test than the two fastest drives, despite its 7200 rpm, probably because its track density isn't as high as the leaders'. (The closer data is packed, the more efficiently it can be read and written.) But the same drive managed the top score on the Photoshop test, outshining the slowest unit, the 3600-rpm Seagate Cabo CFS-1621A IDE drive, by about 30 percent—indicating this SCSI drive does a better job handling large files than smaller files.

Despite the large differences on the individual disk-intensive tests, overall results were very close: The fastest hard disk we tested was the HP SureStore 2000LP SCSI drive, which outperformed the slowest IDE unit by only 9 percent overall. The

FEATURES COMPARISON IDE Drives Store up to 2560MB and Still Win the Price War

● = Yes ○ = No n/a = not available

Company	Model	Key features: Formatted capacity (MB)	Key features: Form factor/ height (inches)	Key features: Street price	Performance: Rotational speed (rpm)	Performance: Average seek time (ms)	Performance: Cache on drive (K)
FUJITSU COMPUTER PRODUCTS OF AMERICA 800/626-4686	M2714	1080	3.5/.5	$495 [1]	3600	12	128
	M1614	1090	3.5/1	$199	4500	11	64
HEWLETT-PACKARD 800/826-4111	HP SureStore 1080A	1080	3.5/1	$220	4480	12	128
	HP SureStore 1600A	1626	3.5/1	$285	4480	12	128
HITACHI AMERICA, LTD. 800/448-2244	DK213A-13	1350	3.5/.75	$410	4464	12	128
IBM PERSONAL COMPUTER 800/772-2227	Deskstar 1.70GB AT	1700	3.5/1	$305	4500	12	128
MAXTOR CORP. 800/262-9867	71336A	1336	3.5/1	$299 [1]	4480	12	64
	71336AP	1336	3.5/1	$299 [1]	4480	12	128
	71670A	1670	3.5/1	$319	4480	12	64
	71670AP	1670	3.5/1	$319	4480	12	128
	72004 A	2004	3.5/1	$399 [1]	4480	12	64
	72004 AP	2004	3.5/1	$399 [1]	4480	12	128
QUANTUM CORP. 800/624-5545	Bigfoot 1280	1280	5.25/.75	n/a	3600	15.5	128
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	Sirocco 1700	1700	3.5/1	n/a	4500	11	76
	Sirocco 2500	2500	3.5/1	n/a	4500	11	76
	Bigfoot 2550	2550	5.25/.75	n/a	3600	15.5	128
SAMSUNG ELECTRONICS AMERICA 800/933-4110	PLS-31084A	1080	3.5/1	$219	4500	11	256
	STG-31271A	1280	3.5/1	$235	4500	11	256
	STG-31601A	1601	3.5/1	$289	4500	11	256
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	Medalist 1080sl	1083	3.5/.75	$229	5400	10.5	128
	Cabo CFA1275A	1275	3.5/1	n/a	4500	12	256
	Cabo CFS1275A	1275	3.5/1	n/a	3600	12.5	64
	Cabo CFS1276A	1275	3.5/1	n/a	4500	14	64
	Medalist 1270sl	1283	3.5/.75	n/a	5400	10.5	128
	Cabo CFS1621A	1620	3.5/1	n/a	3600	14	64
	Medalist 2140	2113	3.5/1	n/a	5400	10	256
TOSHIBA AMERICA INFORMATION SYSTEMS 714/457-0777	MK-1301MAV	1350	3.5/.5	$365	4200	13	128
	MK-2720	1350	3.5/.74	n/a	4200	13	128
	MK-2101 MAN	2160	3.5/.74	$500	4200	13	128
WESTERN DIGITAL CORP. 800/832-4778	Caviar AC21000	1083	3.5/1	$229	5200	12	128
	Caviar AC21200	1280	3.5/1	$269	5200	12	128
	Caviar AC31600	1624	3.5/1	$349	5200	11	128
	Caviar AC32100	2135	3.5/1	$449	5200	13	128
	Caviar AC32500	2560	3.5/1	$499	5200	13	128

[1] List price; street price is unavailable.

The IDE drives we tested all performed well with business applications. From left to right: The Seagate Cabo CFS1621A, Fujitsu M1614, HP SureStore 1600A, Quantum Fireball 1280, Seagate Medalist 2140, and Western Digital Caviar AC31600.

1060MB Seagate Hawk 2LP 1GB and 1280MB Quantum Fireball 1280 SCSI drives were second and third. A tight pack of IDE and SCSI products were close behind, and the Fujitsu, Seagate, and HP IDE drives brought up the rear.

One drive we tested, the 1280MB Quantum Fireball, is available in both an IDE and a SCSI version. Both spin at 5400 rpm, and their performance was very similar. Only on the Picture Publisher test did the SCSI version take a 6 percent edge.

	PIO Mode 3 (13.3MB/sec max transfer rate)	PIO Mode 4 (16.7MB/sec max transfer rate)	Multiword DMA	Reliability and service: Warranty (years)	Contact start-stop cycles	G shock rating (operating/ nonoperating	Energy saving or sleep modes	SMART failure prediction	Online support sites	Reader service number
	●	●	●	3	50,000	100/500	●	○	CIS	782
	●	●	○	3	40,000	5/75	●	○	CIS	782
	●	●	●	3	50,000	45/ 120	●	○	BBS, WWW	783
	●	●	●	3	50,000	45/120	●	○	BBS, WWW	783
	●	●	●	3	50,000	150/250	●	○	WWW	784
	●	●	●	3	40,000	30/75	●	●	BBS, AOL, CIS, Prodigy, WWW	–
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	●	●	●	3	50,000	34/100	●	●	BBS, WWW	785
	○	●	●	3	20,000	10/70	●	●	BBS, WWW	786
	○	●	●	3	40,000	10/70	●	●	BBS, WWW	786
	○	●	●	3	40,000	10/70	●	●	BBS, WWW	786
	○	●	●	3	40,000	10/70	●	●	BBS, WWW	786
	○	●	●	3	20,000	10/70	●	●	BBS, WWW	786
	●	○	●	3	50,000	10/75	●	○	BBS	787
	●	●	●	3	50,000	10/75	●	○	BBS	787
	●	●	●	3	50,000	10/75	●	○	BBS	787
	●	●	●	3	60,000	5/75	●	●	BBS, WWW	788
	●	●	●	3	40,000	10/75	●	●	BBS, CIS, WWW	788
	●	●	●	3	60,000	5/75	●	●	BBS, WWW	788
	●	●	●	3	60,000	5/75	●	●	BBS, WWW	788
	●	●	●	3	60,000	5/75	●	●	BBS, WWW	788
	●	●	●	3	40,000	10/75	●	●	BBS, CIS, WWW	788
	●	●	●	3	60,000	5/75	●	●	BBS, WWW	788
	●	●	●	3	40,000	1/04	●	●	BBS, CIS, WWW	788
	●	●	●	1	n/a	100/200	●	●	BBS, WWW	789
	●	●	●	1	n/a	100/200	●	●	BBS, WWW	789
	●	●	●	1	n/a	100/200	●	●	BBS, WWW	789
	●	●	●	3	60,000	10/150	●	●	BBS, AOL, MSN, WWW	790
	●	●	●	3	60,000	10/150	●	●	BBS, AOL, MSN, WWW	790
	●	●	●	3	60,000	10/150	●	●	BBS, AOL, MSN, WWW	790
	●	●	●	3	60,000	10/150	●	●	BBS, AOL, MSN, WWW	790
	●	●	●	3	60,000	10/150	●	●	BBS, AOL, MSN, WWW	790

For more information about all products in this table, circle reader service no. 911.

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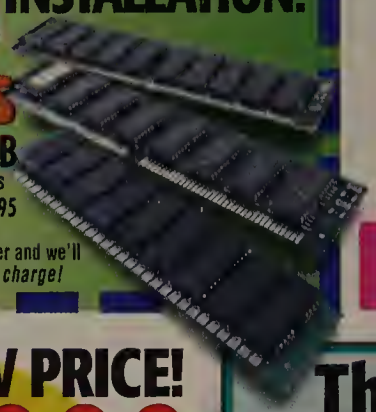

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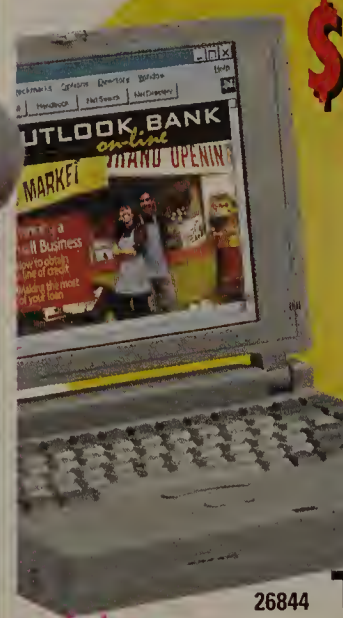

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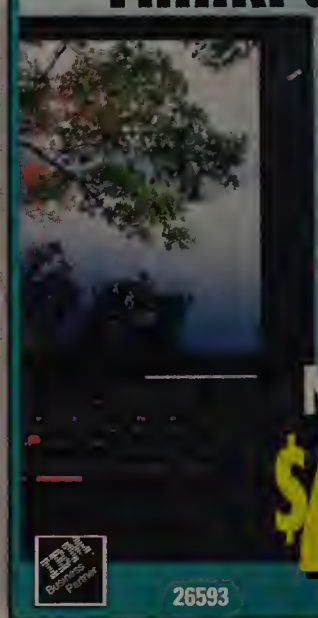
Satellite 100cs

- 75MHz Pentium
- 8MB EDO RAM, 504MB HD
- 10.4" dual scan color display
- Plug & Play
- Integrated AC adapter

26844 **TOSHIBA**

ThinkPad 760LD



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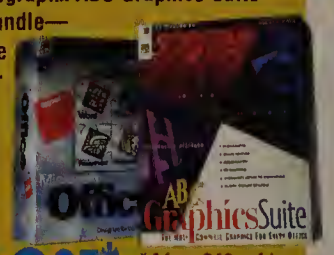

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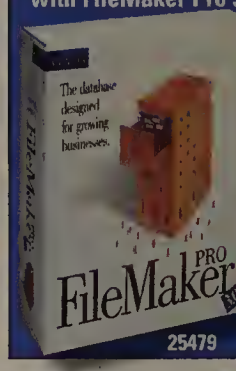

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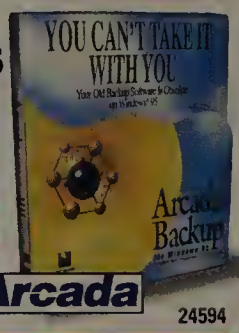

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24539	Microsoft Encarta 96 for Windows 95	49.95
22014	Microsoft Press MS Win 95 Resource Kit	29.95
22294	Microsoft Plus! for Windows CD	44.95
23871	Microsoft Publisher for Windows 95	74.95
22014	Microsoft Windows 95 Resource Kit	29.95
22293	Microsoft Word for Win95 Upgrade	99.95
26388	Microsoft Visual C++ 4.0 Upg w/Subscr	349.95
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- 3 Slots/ 3 Bays
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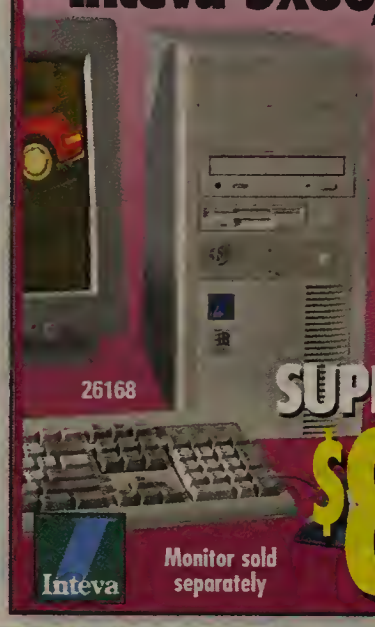

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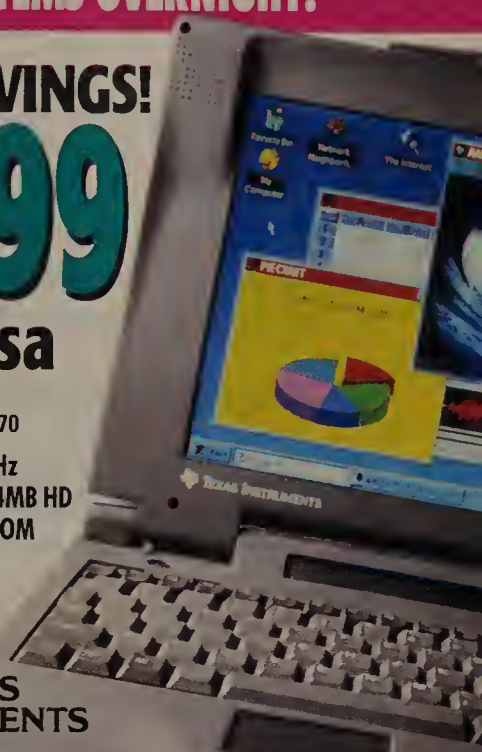

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MGA 64-bit graphics processor plus dual-ported Window RAM for speed and performance. Real-time rendering of 3D graphics.

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26603	Cirque Touch N'Tap	39.95
19584	Corex CardScan XLP100	199.95
25695	Kensington Expert Mouse 5.0	99.95
21279	Logitech Mouse Man Combo	45.95
20799	Primax ColorMobile Office	249.95
22425	Wacom ArtPad II & Dabbler	159.95
21888	Xerox Text8ridge Pro Upgrade	129.

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11105	3COM EtherLink III TP	$109.
27762	3COM Office Connect TPO Hub	149.94
26190	Artisoft Lantastic Win95 1-User	89.95
27780	8ay NetGear 8-Port Hub	159.95
21249	Farallon Timbuktu Pro Windows	139.
24366	Intel PRO 100 PCI-8	149.
22228	Lancast 10T Transceiver	27.95
27940	Lite-On 10/100 PCI	139.95
11006	MDS 10-T Adapter	29.95
18994	Novell NetWare 4.1 5-User 3.5"	649.
22687	Xircom 28.8 Modem & 10T Ethernet	469.

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16747	ATI Graphics Xpression 1M8	$114.95
23561	C. Labs 8laster CD 6X	199.95
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25711	MagInnovision DX15T Monitor	449.
21401	Matrox Millennium 2M8	319.
27011	MDS Sony 4X CD-RDM Drive Int.	99.95
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22081	Macromedia FreeHand 5.0 CD	399.95
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27347	Conner Filepro 4.2G8 SCSI	$999.
22968	Olympus Deltis Recordable CD	1299.
21947	Sony CSP-920S Recordable CD Int.	999.
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27887 2.5GB $449*

*$100 manufacturer's rebate eligibility: Send to WD: UPC code & capacity label from WD box, receipt, coupon with name & address, old hard drive—must be postmarked by 5/31/96.

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SCSI-2 devices are designed to handle disk-intensive apps. Left to right: the Seagate Cabo CFP2107, HP SureStore 2000LP, Quantum Fireball 1280, and Seagate Hawk 2LP 1GB drives; and the Adaptec AHA 2920 and AdvanSys AdvanSCSI ABP930 (bus-mastering) adapters.

Ready, Get Set...

We had no trouble installing any of these drives in our Micron P90 Millennia. Most of the drives provided fairly spartan manuals, and HP's SureStore 1600A IDE kit included just a foldout installation sheet. The exceptions were the Seagate Hawk and Medalist drives, which each came with a 33-page booklet, and the HP SureStore 2000LP SCSI drive, which provided in-depth specification and installation guides. Western Digital also did a good job, including a quick installation guide along with a comprehensive manual detailing BIOS settings and operating systems support. The setup utilities for all the drives are straightforward. The SCSI drives are particularly easy to install, thanks to their support for SCAM (SCSI Configured AutoMatically, the SCSI component of the Plug and Play specification). SCAM relieves you of hav-

FEATURES COMPARISON SCSI Drives Have Capacities up to 9100MB and the Rpm's to Handle Tough Apps

● = Yes ○ = No n/a = not applicable

		Key features			Performance			
Company	Model	Formatted capacity (MB)	Form factor/ height (inches)	Street price	Rotational speed (rpm)	Average seek time (ms)	Cache on drive (K)	Fast SCSI-2 (10MB/sec)/ Wide-SCSI-2 (20MB/sec)
FUJITSU COMPUTER PRODUCTS OF AMERICA 800/626-4686	M2952	2200	3.5/1	$850 [1]	7200	8	512	●/●
	M2934	4400	3.5/1.6	$995 [1]	7200	10	512	●/●
	M2954	4400	3.5/1	$1050 [1]	7200	8	512	●/●
	M2948	8800	3.5/1.6	$1995 [1]	7200	10	512	●/●
	M2949	9100	3.5/1.6	$1995 [1]	7200	10	512	●/●
HEWLETT-PACKARD 800/826-4111	HP SureStore 2000LP	2140	3.5/1	$525	5400	9.5	512	●/●
IBM PERSONAL COMPUTER 800/772-2227	Ultrastar ES 2.16 GB SCSI	2160	3.5/1	$695	5400	8.5	512	●/○
MICROPOLIS CORP. 800/847-8153	Taurus-2 4221	2160	3.5/1	$850	7200	8.9	512 [2]	●/●
	Taurus-2 4221AV	2050	3.5/1	$925	7200	8.9	512 [2]	●/●
	Capricorn 4 3243	4290	3.5/1.6	$1220	7200	8.9	512 [2]	●/●
	Capricorn 4 3243AV	4290	3.5/1.6	$1325	7200	8.9	512 [2]	●/●
	Scorpio 9 1991	9090	3.5/3.25	$1940	5400	12	512 [2]	●/●
	Scorpio 9 1991AV	9090	3.5/3.25	$2150	5400	12	512 [2]	●/●
QUANTUM CORP. 800/624-5545	Atlas 1	1075	3.5/1	$699	7200	8.5	2048	●/●
	Fireball 1280	1280	3.5/1	$350	5400	11	80	●/○
	Atlas 1	2150	3.5/1	$849	7200	8.5	1024	●/●
	Atlas 1	4300	3.5/1.6	$1269	7200	8.5	1024	●/●
SEAGATE TECHNOLOGY 408/438-8111	Hawk 2LP 1GB	1060	3.5/1	$375	5400	9	512 [3]	●/●
	Cabo CFP1080	1080	3.5/1	n/a	5400	11	512 [3]	●/●
	Medalist 1080sl SCSI	1080	3.5/.75	n/a	5400	12.5	128	●/○
	Barracuda 2LP	2147	3.5/1	n/a	7200	11	1024	●/●
	Cabo CFP2105	2147	3.5/1	n/a	5400	8.5	512	●/●
	Cabo CFP2107	2147	3.5/1	$799	7200	8.5	512	●/●
	Hawk 2LP 2GB	2149	3.5/1	$699	5400	9	512 [3]	●/●
	Barracuda 4LP Fibre Channel	2250	3.5/1	n/a	7200	8	512	○/○
	Barracuda 4LP Ultra SCSI	2250	3.5/1	n/a	7200	8	512	●/●
	Barracuda 4 ST15150	4294	3.5/1.6	$1249	7200	8	1024	●/●
	Barracuda 4 ST15150 Fibre Channel	4294	3.5/1.6	$1249	7200	8	512	○/○
	Cabo CFP4207	4294	3.5/1.62	n/a	7200	9	512	●/●
	Barracuda 4LP Fibre Channel	4550	3.5/1	n/a	7200	8	512	○/○
	Barracuda 4LP Ultra SCSI	4550	3.5/1	n/a	7200	8	512	●/●
	Elite 9	9090	5.25/3.3	$2299	5400	11	1024	●/●
	Barracuda 9 Fibre Channel	9100	3.5/1.6	n/a	7200	8	512	○/○
	Barracuda 9 Ultra SCSI	9100	3.5/1.6	n/a	7200	8	512	●/●

[1] List price; street price unavailable. [2] 2MB optional. [3] 256K on Fast SCSI-2.

ing to worry about vexing technical details like setting SCSI IDs and termination.

None of the drives was noisy, although the 1090MB Fujitsu M1614 IDE drive stood out as the quietest by far. If you're used to hearing your drive clicking away, you may even find this one a bit unnerving. The HP and Seagate SCSI drives also impressed us as quieter than usual.

The Shapes of Drives to Come

Drives will continue to gain in capacity and speed. But can costs per megabyte keep dropping? That remains to be seen, although Quantum has now managed to reduce costs to a mere 15 cents a megabyte in its new Bigfoot IDE drives. The company says this 5¼-inch drive spins a larger disk at a fairly low 3600 rpm, making it less expensive to build. However, the company says the Bigfoot's disk diameter helps keep performance high. Some other vendors may follow suit by fielding similar products, although 3½-inch drives should continue to be the mainstream.

In the next few years, expect the division between inexpensive IDE drives and high-performance SCSI products to become more distinct as people use their PCs for more graphics-intensive work. Ultra SCSI is likely to gradually replace SCSI-2, as there is little penalty in manufacturing cost attached to its higher-performance SCSI technology. But because of their even more advantageous price/performance balance, IDE drives will remain the most popular over at least the next two to three years.

Rex Farrance is a senior associate editor and Arden Hoffman is an assistant editor for PC World. *Testing by Michael Salayko and Susan Silvius of the PC World Test Center.*

For more information about all products in this article, circle reader service no. 906.

	Ultra SCSI (20MB/sec)/ Ultra Wide SCSI (40MB/sec)	Fibre channel (100MB/sec)	Reliability and service: Warranty (years)	Contact start-stop cycles	G-shock rating operating/ nonoperating	Energy-saving or sleep modes	SMART failure prediction	Online support sites	Reader service number
	○/○	○	3	20,000	5/50	n/a	●	CIS	791
	○/○	○	3	20,000	5/50	n/a	○	CIS	791
	○/○	○	3	20,000	5/50	n/a	●	CIS	791
	○/○	○	3	20,000	5/50	n/a	●	CIS	791
	○/○	○	3	20,000	5/50	n/a	●	CIS	791
	○/○	○ ○	5	10,000	3.0/50	○	○	BBS, WWW	792
	○/○	○	5	40,000	30/75	●	●	BBS, AOL, CIS, Prodigy, WWW	–
	○/○	○	5	12,000	10/60	○	○	BBS, CIS, WWW	793
	○/○	○	5	12,000	10/60	○	○	BBS, CIS, WWW	793
	○/○	○	5	12,000	10/60	○	○	BBS, CIS, WWW	793
	○/○	○	5	12,000	10/60	○	○	BBS, CIS, WWW	793
	○/○	○	5	12,000	8/30	○	○	BBS, CIS, WWW	793
	○/○	○	5	12,000	8/30	○	○	BBS, CIS, WWW	793
	○/○	○	5	20,000	10	○	○	BBS, WWW	794
	○/○	○	3	40,000	10/70	●	●	BBS, WWW	794
	○/○	○	5	20,000	10	○	○	BBS, WWW	794
	○/○	○	5	20,000	10	○	○	BBS, WWW	794
	●/●	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	○	5	40,000	5/75	●	○	BBS, WWW	795
	○/○	○	3	40,000	10/73	●	●	BBS, CIS, WWW	795
	○/○	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	○	5	n/a	5/75	●	○	BBS, WWW	795
	○/○	○	5	n/a	5/75	●	○	BBS, WWW	795
	●/●	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	●	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	●/●	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	●	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	○	5	n/a	5/75	●	○	BBS, WWW	795
	○/○	●	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	●/●	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	○/○	●	5	[4]	10/60	●	●	BBS, CIS, WWW	795
	●/●	○	5	[4]	10/60	●	●	BBS, CIS, WWW	795

[4] Not rated.

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Dell's featured computer artist is Mick Wiggins.

No PCs run Windows 95 as well as Dell PCs. Just ask *PC World,* who recently reviewed over 160 desktops and notebooks to judge how well they run Windows 95. And in the end, Dell cleaned up with four Best Buy Awards.

The Dell Dimension P120c and the Dell Dimension P75t won in the Power and Budget Desktop categories. And the Dell Latitude LX 4100T and the Dell Latitude LX 4100D won in the Power and Budget Notebook categories.

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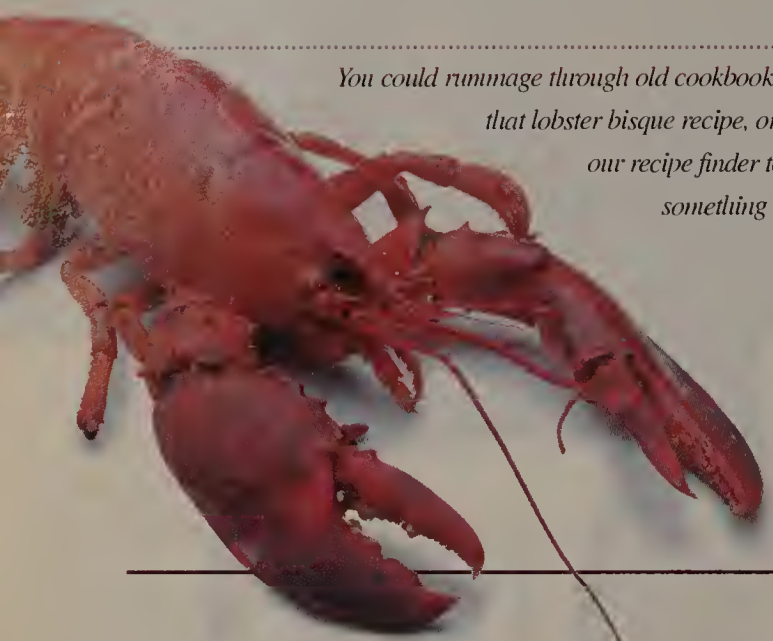

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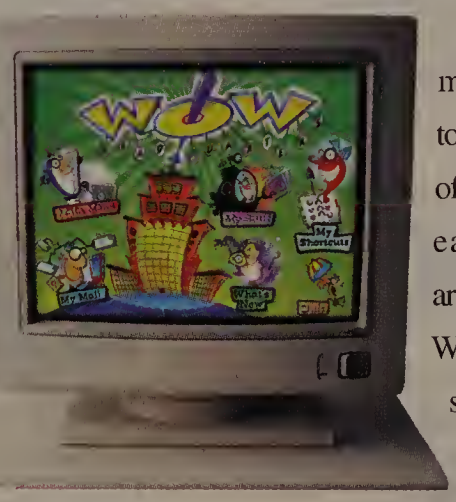

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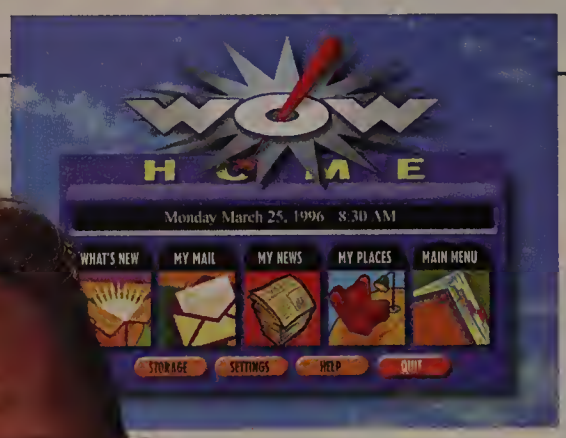

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SMARTSUITE
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SOFTWARE SUITES FOR WINDOWS 95

ROUND II

Can Lotus SmartSuite 96 unseat Microsoft Office 95? For most users, the answer is no. Here's why.

EDITED BY CATHY KENNY

To borrow very loosely from Forrest Gump, office software suites are like a box of chocolates: You never know what you're going to get. Will it be a box full of winning applications, or a bundle that will leave a bitter taste in your mouth? In our December review of Microsoft Office 95, the only Windows 95 application suite available at the time, we found a product that was slower than before and a trifle boring as an upgrade (see "Microsoft Office 95: Who Needs It?"). Our advice was to wait and see what you could get with one of Office's yet-to-ship competitors, SmartSuite or PerfectOffice. But after testing Office 95 and SmartSuite 96 in this head-to-head review for usability, features, and speed, we can say conclusively that the pickings are still slim. The biggest incentives to buy SmartSuite 96 are its team computing tools, implemented the most heavily in Word Pro. Office 95 is still a long way from offering the kinds of benefits these utilities give workgroups who need to collaborate on documents. But in almost all other ways, Office 95 is simply the better suite. It's faster than SmartSuite (if not it's old Windows 3.11 self), it's easier to use overall, and, taken as a whole, it's a superior group of applications.

It's possible that the newly rechristened Corel WordPerfect Suite (formerly known as PerfectOffice) could prove to be the best of the three suites when it ships sometime this summer. But that's pretty iffy. Although WordPerfect Suite consists of a larger number of applications (including WordPerfect, Quattro Pro, Presentations, Envoy, Netscape Navigator, CorelFlow 2.0, Starfish Software's Sidekick and Dashboard, and a whole slew of fonts and clip art images) it lacks both a database and the personal information manager InfoCentral. Furthermore, in the beta version we looked at, Quattro Pro and Presentations weren't exactly balls of fire compared to those in Office and SmartSuite. To see how SmartSuite 96 stacks up to Office 95, we conducted in-depth performance tests and hands-on usability evaluations of both suites. To test speed, we hand-timed common tasks in all the apps except the schedulers. We also timed how long it took to perform some data sharing chores, such as embedding a spreadsheet chart object in the word processor. To see what kind of

JAMES YANG

performance an upgrader might expect, we tested not only the new Windows 95 suites, but also their previous versions (Office 4.3 and SmartSuite 4.0), under both Windows 3.11 and 95. To determine how people with varying levels of hardware might fare, we tested on four configurations—a 66-MHz 486DX2 and a Pentium-90, both tested once with 8MB of RAM and again with 16MB.

To gauge usability, we brought eight users into our Test Center to perform some common integration chores. All testers had used prior versions of either SmartSuite or Office. Tasks included running through each suite's tutorial, creating appointments and to-do items in the schedulers, using shortcuts such as those in the SmartCenter and Office Shortcut Bar, and linking spreadsheet data to word processing documents.

In the end, Microsoft Office 95 emerged as the better suite, for several reasons. Its most obvious advantage—its cohesive look and feel and the ability to use Win 95 features across apps—comes from its fully 32-bit application base. Unlike SmartSuite 96, which is still a mixed bag of Windows 95 programs (Word Pro 96, Freelance Graphics 96, and Approach 96) and older 16-bit holdovers (1-2-3 release 5.01 and Organizer 2.1), Office 95 has had a full suite of 32-bit programs since it shipped last August.

When pitted application to application, Office 95 comes out on top. All of its core programs—word processor, spreadsheet, and database—have an edge in features over SmartSuite's. Lotus's Word Pro, for instance, is a nice effort with some impressive new tools and productivity enhancements. But many of Word 7.0 for Windows 95's tools are slicker. For example, Word 7.0's AutoFormat feature corrects format inconsistencies—such as different types of bullets—as you type; in Word Pro, you have to run Check Format manually.

SmartSuite's database, Approach 96, has added so many bells and whistles—including a real programming language—that it now seriously competes with Office's Access. But Access still has more complete features, with better SQL access, spreadsheet integration, and other tools that make it more attractive to power users.

The biggest gap can be seen in the two suites' spreadsheets. In the features footrace, Excel has become a speck in the distance while 1-2-3 struggles to make it out of the starting block. If 1-2-3 is ever to catch up to Excel's developments in both basic and high-end tools—importing and pivot tables, to name two—Lotus will have to work hard and fast.

SmartSuite 96's second-tier apps have more luck holding their own against Office 95's apps. The 16-bit Organizer, for instance, appears at first to be the underdog to Office's slick new Schedule+ personal information manager. But Organizer is a little easier to use than Schedule+ and even bests it by adding basic tools every PIM should have, like the ability to take free-form notes. But one of the biggest reasons to buy SmartSuite is for its presentation graphics. Office's PowerPoint is great, but the new interface on SmartSuite's Freelance Graphics brings impressive new ease to creating and revising presentations.

In This Corner...

Lotus SmartSuite 96 for Windows 95

PROS:

Group friendly New "team computing" tools make it a snap to share files.

Low cost. SmartSuite 96 is much cheaper than Office 95.

Desktop control Track files, contacts, and appointment all from the desktop.

CONS:

Incomplete 16-bit versions of 1-2-3 and Organizer hinder integration.

Slower SmartSuite is slower than its previous version and Office 95.

PRICING: $399, upgrade $199
Lotus Development Corp.
800/343-5414
Reader service no. 778

VS

Microsoft Office 95 Professional Edition

PROS:

Usability champ Office 95's wizards and automatic formatting tools make it easier to use than SmartSuite.

Complete suite 32-bit versions of all Office apps make full use of Win 95.

Easy to create compound documents Stash related files in the Binder.

CONS:

Unfriendly to groups You're on your own, especially when sharing files.

Slow Office 95 is faster than SmartSuite 96 but slower than Office 4.3.

PRICING: $599, upgrade $399
Microsoft Corp., 800/426-9400
Reader service no. 779

Slow and Slower

We complained about Office 95's speed in our December review, but SmartSuite 96 manages to be even slower. Not only is SmartSuite slower overall than its previous version, but almost every application in it lags behind its Office 95 counterpart, especially Word Pro, which took up to three times as long to print, regardless of computing platform or amount of RAM. Only Freelance Graphics held its own—except in printing, probably because it doesn't have PowerPoint's multithreading.

SmartSuite will run on a 486 equipped with 8MB of RAM, but we think you'll find some operations unbearably slow. For acceptable performance—especially in Word Pro—we recommend the fastest machine you can get your hands on, with at least 16MB of RAM. Upgrading RAM made a big difference in SmartSuite's tests: Adding 8MB of RAM for a total of 16MB on our 486DX2-66 gave us an overall performance boost of 46 percent; on our Pentium-90, it boosted speed 58 percent.

Do You Know the Way to OLE?

Each generation of office suites gets a little closer to that Holy Grail of bundled business applications: easy data sharing. But the features for those data sharing operations have to get easier to use before the average user will benefit. According to our usability testers, Office 95 makes it easier to share data than SmartSuite 96 (see "SmartSuite 96 Lags Behind Office 95 in Usability"), but Office still has its share of problems. The option of using Windows 95's Taskbar to drag and drop information has made sharing data

between applications easier in both of these suites. But using Object Linking and Embedding—which lets you embed data from other applications and update them using dynamic links—can still be a pain because the suites do such a poor job of explaining how to use it. SmartSuite's inadequate help screens, for instance, prevented some testers from successfully creating a link between a 1-2-3 spreadsheet range and Word Pro.

In fact, some of our testers had trouble grasping the suites' two biggest data sharing tools: Office's Binder, and Word Pro's tabbed document divisions. Both provide a seemingly simple way to collect OLE-compliant documents in one place for easier organization and launching. In Binder you place documents in a single file; in Word Pro you attach documents to tabs. But Binder's support for a limited number of applications (mostly from Microsoft) confused some people, who couldn't understand why only a few programs were listed as available. And Word Pro's scheme of linking files (instead of combining them into one file like Binder does) stymied some testers who did not know they had to update file names and locations in Word Pro manually if those things changed.

Neither One's a Charm

With only two Windows 95 suites to choose from, and neither one a blockbuster, where do you go from here? If you already upgraded to Windows 95 and want a suite now, it's a pretty easy choice. For all the reasons we've mentioned, Office 95 has the edge. For $599, you get five applications: Access, Excel, PowerPoint, Schedule+, and Word. SmartSuite 96's main charms are its team computing features and its price. For $399, you get six applications (including the ScreenCam utility). If you don't mind waiting a few months for the 32-bit versions of 1-2-3 and Organizer (the package includes free upgrade coupons), the savings you get from buying SmartSuite now might be worthwhile.

Cathy Kenny is an associate editor for PC World. *Richard Jantz, Celeste Robinson, and Richard Scoville are contributing editors for* PC World, *and Reid Goldsborough and Peter Scisco are frequent contributors. Testing conducted by Kevin Mitchell and the PC World Test Center. Usability testing designed by Susan Silvius and Brad Grimes.*

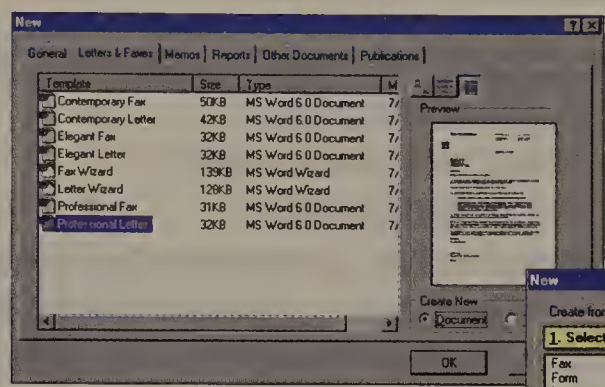
Word Pro 96

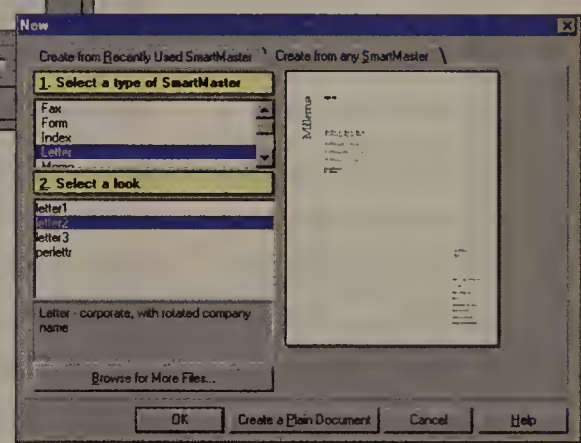
Looks Great, but Less Satisfying

PROS: Tabbed document sections, all-in-one InfoBox formatting tool, powerful group editing features, Ask the Expert help system

CONS: Lack of multithreading slows down performance, limited document templates

At first blush, Word Pro 96 looks like it could be a Word killer. It not only beats Word 7.0 in workgroup features, it also has an inviting new interface and lots of productivity tools sure to attract individual users as well. However, the excitement over all those great fea-





WORD'S WIZARDS offer format and content (above); Word Pro's mostly blank SmartMaster templates (right) provide formatting only.

FEATURES COMPARISON Word 95's Wizards and Ease of Use Beat Word Pro

	Word 95	Word Pro 96	Comments
Windows 95 support	Good job	Adequate	Lack of multithreading brings Word Pro to a near halt.
Workgroup tools	Adequate	Good job	Word Pro's best new features by far.
Document templates	Good job	Needs work	Word's document wizards best Word Pro's SmartMasters.
Editing tools	Good job	Good job	Both products have good ones.
On-screen help	Adequate	Adequate	Adequate in both.
Interface design	Adequate	Good job	Word Pro's divider tabs and InfoBox stand out.
Usability enhancements	Good job	Adequate	Word's spelling checker and wizards beat Word Pro.
Long document features	Adequate	Good job	Word Pro's tabbed divisions make organizing a snap.
Internet support	Good job	Good job	Both let you open and save files from the World Wide Web.
Programming	Needs work	Adequate	Word Pro gets new LotusScript.
Speed	Adequate	Needs work	Except for search and replace, Word is faster than Word Pro.

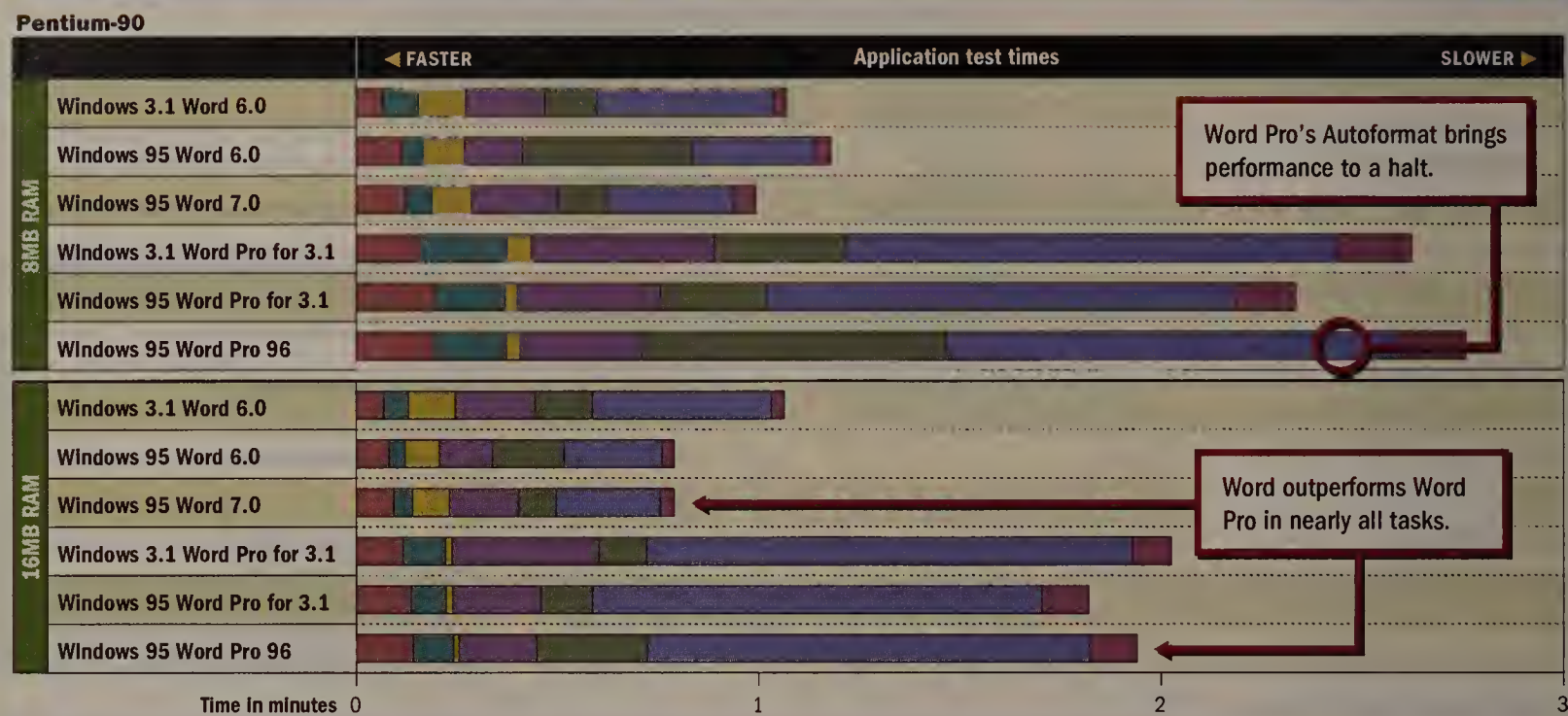
Good job Adequate Needs work

tures will soon fade as you sit and wait for Word Pro 96 to load, open files, and print. Unable to match the speed of Word 7.0—or even its Windows 3.1 counterpart in some operations—Word Pro suffers from one of the biggest destroyers of promising software: slow performance. That's the major reason it doesn't make any real strides against word processing champ Microsoft Word.

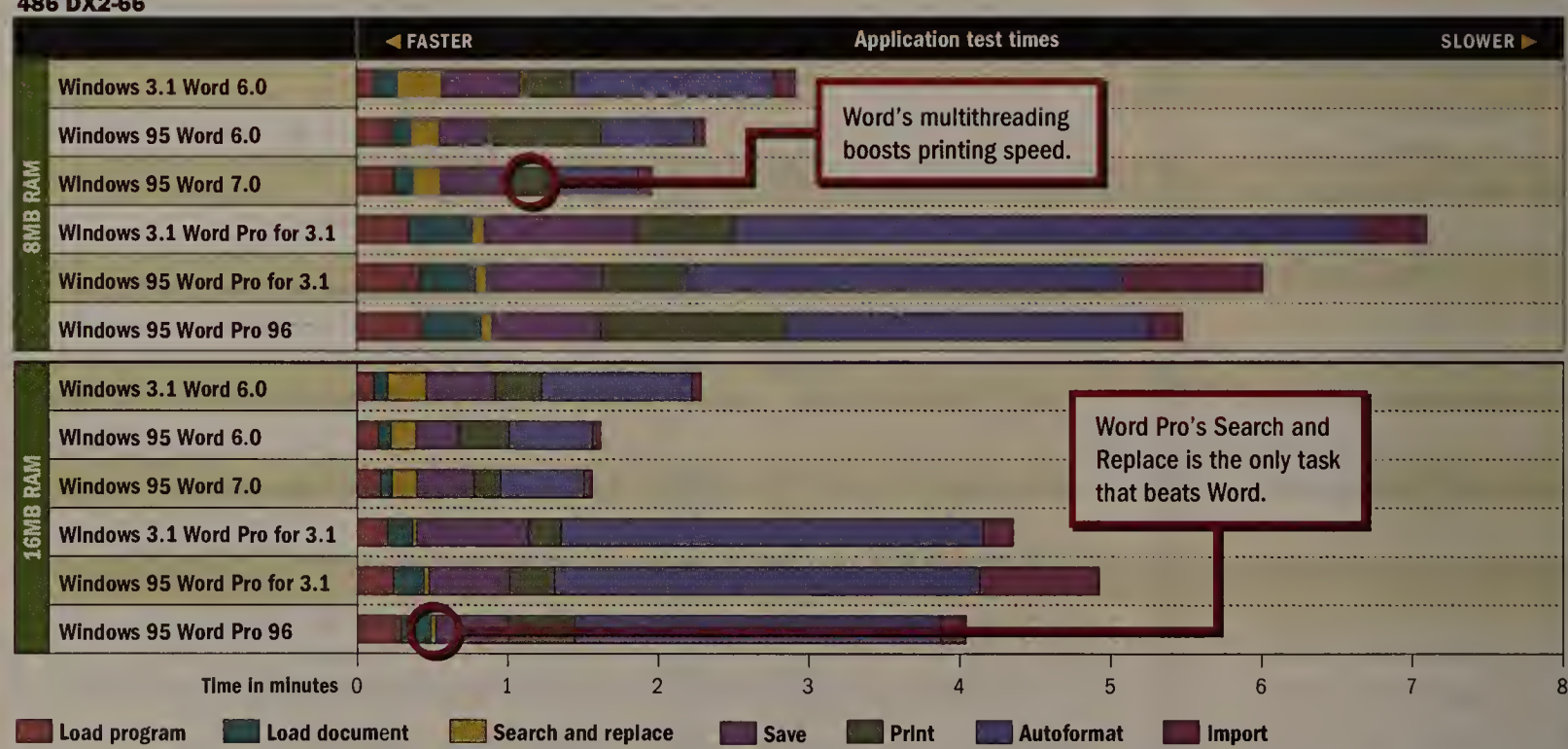
Family Ties

The first thing you'll notice about Word Pro is the SmartSuite family resemblance. It sports the same interface elements as Approach and Freelance—tabbed pages, movable SmartIcon palettes, a refined menu structure, and the InfoBox formatting tool. The tabbed division feature helps to organize long documents by divid-

TEST REPORT Word 7.0 Shows Some Improvements, but Word Pro 96 Is Just Plain Slow



TEST REPORT Word Pro Struggles to Keep Up With Word 7.0 on a 486



Methodology Tests were conducted on a Micron Millennia Pentium-90 (with an 850MB IDE hard drive and a 2MB Diamond Stealth64 graphics controller), and on a Gateway 486 DX2-66v (with a 320MB IDE hard drive and an ATI Ultra Pro Mach 32 graphics controller). We installed the default configuration of Windows for Workgroups 3.11, ran our tests, then installed the default configuration of Windows 95 and ran our tests again. Tests were done by hand. Timing ended when we regained control of the cursor.

Word Processing We loaded a 50-page document and performed formatting, editing, and searching tasks; reformatted with the Autoformat command; and imported a 160K .gif file. The printing test timed output of a 20-page document. **Data based on tests designed and conducted by the PC World Test Center. All rights reserved.**

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SmartSuite 96 Integration: How It Works

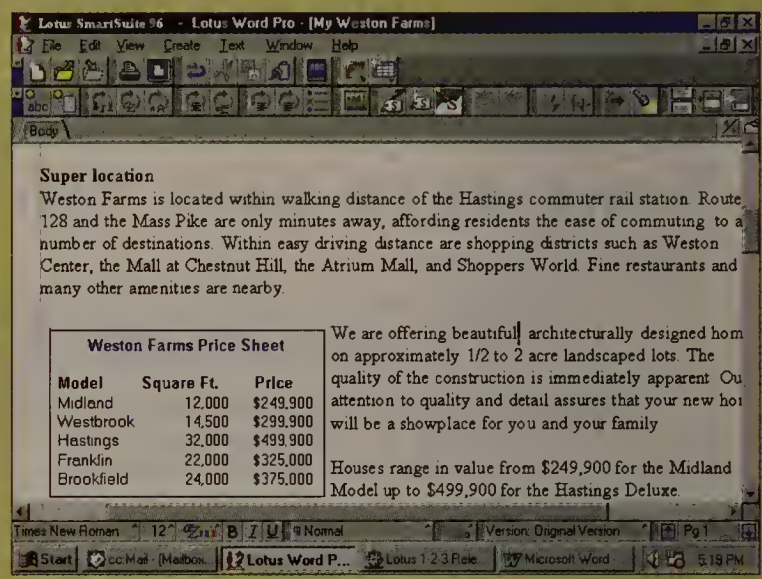
In its current state, SmartSuite 96 can't compete with the fully 32-bit Office 95. But for a Windows 95 office suite saddled with two 16-bit applications (Organizer and 1-2-3), SmartSuite 96 does a fair job of integrating information. It's significantly better at this than before and even manages to challenge Office in a couple of important areas. Unfortunately, as in Office 95, linking applications and sharing information takes longer than in previous versions, as do most other tasks. Our usability testers also had nits to pick with the steps that both suites require users to take to share data.

Integration for All

Despite their disparate interfaces, SmartSuite's 16-bit and 32-bit applications offer a fair amount of interaction. For example, you can create Approach forms and reports from within 1-2-3, and you can drag and drop data from 1-2-3 into Word Pro or Freelance. A new feature lets you access Organizer's Address Book and Calendar directly from SmartCenter, the suite's all-in-one data repository tool.

Although we liked SmartCenter better than Office's similar but less talented Shortcut Bar, it's still not entirely clear why anyone would want to use these tools in addition to Windows 95's Start menu. Both the SmartCenter and Shortcut Bar are easier to maintain than the sprawling Start menu, but most users probably won't go to the trouble of learning a new interface. In addition, our usability testers found the number of toolbars cluttering the screen confusing and in most cases turned them off.

Still, the SmartCenter can prove to be a useful tool. You can store applications, documents, and folders according to their functions. You can also add multiple folders to a single drawer, much as you would in a real file cabinet. In Office, you can only create additional toolbars on which to store these items. The SmartCenter also displays the name alongside each file icon; in Office you must point to each icon to determine its name.



SMARTSUITE 96 OFFERS INTEGRATION among all its applications, including the 32-bit Word Pro and 16-bit 1-2-3.

Compounding Trouble

Both SmartSuite 96 and Office 95 let you create compound documents, but they haven't done a very good job of showing you how to do it. For instance, when you drag and drop data between applications in Office 95—say from Excel to Word—you have to remember to hold down <Ctrl> as you drag, or Office will cut the data from Excel and paste it into Word. When you return to Excel, you'll find a disturbing hole in your worksheet. SmartSuite's implementation is cleaner: Its default is to paste only a copy of the source data.

When our testers tried to establish an active link between a range of spreadsheet cells and a word processing document, both suites flopped. Neither SmartSuite nor Office makes it clear that you use the Edit • Paste Special command to create the link. So most of our testers turned to the only command that resembled the task at hand, Insert • Object (which only inserts a copy of the file). Turning to the help system wasn't of much use either: Both SmartSuite and Office required users to dig through a stack of help screens before they could find the correct information. —Reid Goldsborough

FEATURES COMPARISON Office 95's Binder and Full 32-Bit Roster Beat Incomplete SmartSuite

Good job · Adequate · Needs work

	Office 95	SmartSuite 96	Comments
Windows 95 support	Good job	Needs work	SmartSuite's 1-2-3 and Organizer are still 16-bit apps.
Interface design	Good job	Adequate	Much improvement in both, but SmartSuite needs to complete the 32-bit app roster.
Command center	Adequate	Good job	The SmartCenter does a better job of keeping you organized.
Compound documents	Good job	Adequate	Office's Binder is better for sharing multiapplication files than Word Pro's divisions.
Programming language	Adequate	Adequate	Both are powerful but difficult to master.

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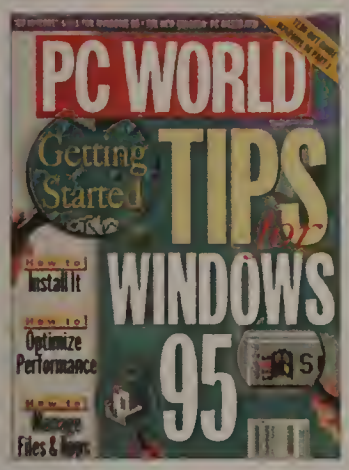

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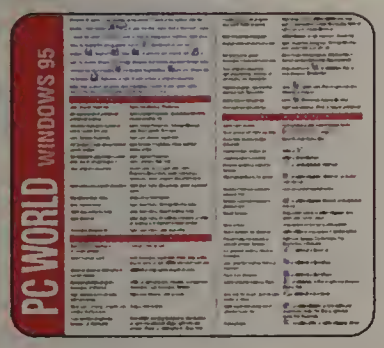

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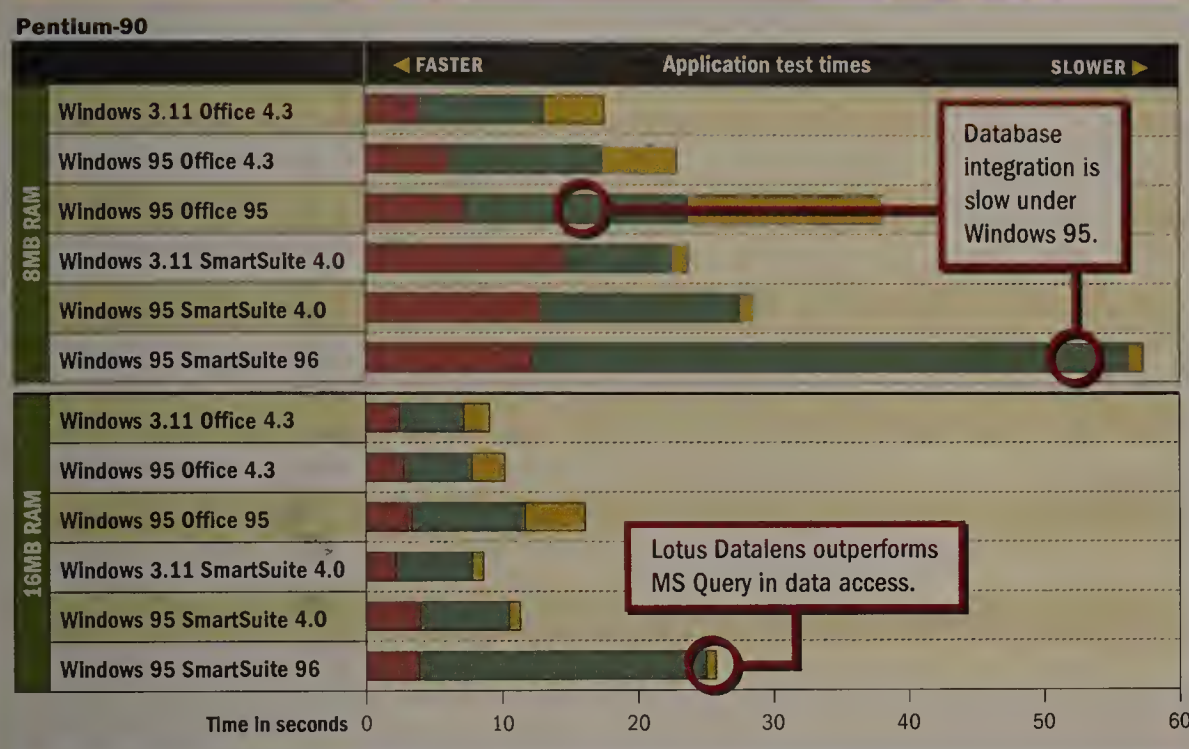
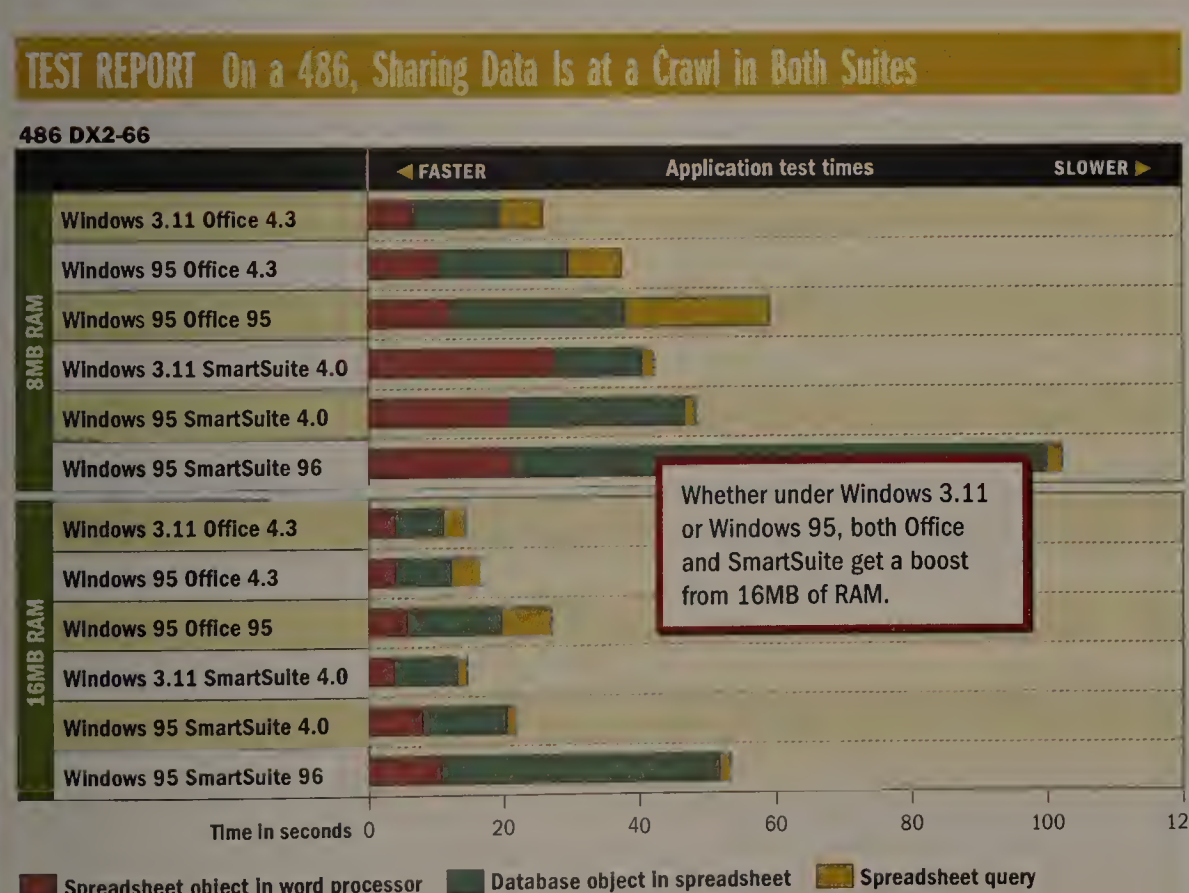
ing a file into sections. The InfoBox is likely the biggest improvement. It lets you assign fonts, apply line spacing, and set indents, all from a single point—and it remains on screen while you work.

Similar to Freelance and Approach, Word Pro provides a number of SmartMasters that help you quickly create documents such as business proposals and newsletters. But Word Pro's mostly blank SmartMasters aren't as useful as those found in Freelance, which come with plenty of canned content to customize. Word Pro's templates are also inferior to what you'll find in Word 7.0. In addition to offering a better selection of templates, Word also provides document wizards, which automate document creation. For instance, to create a document, you just activate a wizard and fill in a series of dialog boxes. When you're done, Word creates a document based on your choices.





For methodology, see "Word 7.0 Shows Some Improvements, but Word Pro 96 Is Just Plain Slow."

Integration Operations include editing a spreadsheet link from within a word processing document and updating a database link from within a spreadsheet. We also imported a 50-record subset from a 2000-record database file into a spreadsheet using native MS Query and Lotus Datalens drivers. **Data based on tests designed and conducted by the PC World Test Center.**
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Go Team Computing

Word Pro's strongest feature is its ability to streamline the most onerous of collaborations—the document edited by committee. Word 7.0's revision marking and text highlighting tools are dandy, but they're no match for Word Pro's array of options.

Word Pro's TeamReview command allows you to assign specific editing rights to collaborators and indicate whether to store revisions in a separate version or in the original document. TeamMail lets you send a document to a group of editors in sequence, via either cc:Mail or Microsoft Mail.

TeamConsolidate is by far the easiest way to manage input from other users. You simply distribute your document, and as your coworkers complete their changes, they send the file back. You then use TeamConsolidate to merge the changes into one file, with each edit marked and annotated with the reviewer's name.

What Price Speed?

No doubt about it: Word Pro 96 has lots of nifty new features going for it. But Word 7.0 has something Word Pro doesn't: speed you can live with. We recommend you wait for the next version, when Lotus gets another chance to make it right.

—Cathy Kenny

Freelance Graphics 96

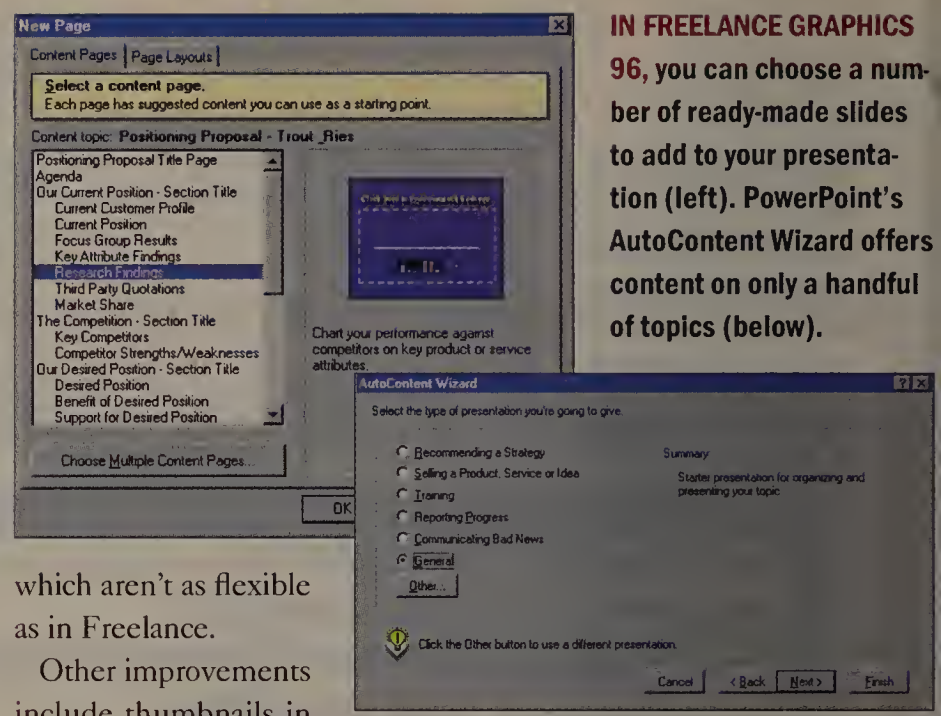
Better Than PowerPoint

PROS: Streamlined interface, content-specific SmartMasters, diagramming tools
CONS: Poor performance

Topping presentation rival Microsoft PowerPoint 7.0 for Windows 95 is no easy feat. But Freelance Graphics 96 has done so in two key areas: creating presentation content and revising it. PowerPoint still excels in presentation delivery, with easier screen-show features and faster printing. But our performance tests reveal that there is one area where Freelance is just like PowerPoint—its slower across the board compared to the previous version.

Freelance's improved interface includes tabs, which make it easier to switch between views, and a Guide Me icon that offers context-sensitive help. Drawing and text tools appear only as you need them, and formatting is streamlined via the InfoBox. In comparison, PowerPoint relies on a number of different dialog boxes.

One of the best features in Freelance is its new Content SmartMasters, each of which contains detailed suggestions on over 30 different topics. PowerPoint's AutoContent Wizard looks anemic in comparison: It provides content for only 7 presentation topics, which aren't as flexible as in Freelance.



IN FREELANCE GRAPHICS 96, you can choose a number of ready-made slides to add to your presentation (left). PowerPoint's AutoContent Wizard offers content on only a handful of topics (below).

Other improvements include thumbnails in the Outliner, which show what your slides look like as you edit the text, and the much-improved drawing tools, which feature drag-and-drop text shapes and sticky connectors (similar to those in Visio Corporation's Visio). Like its SmartSuite companions, Freelance includes team computing tools. With TeamReview, a group of Freelance users can annotate a presentation. You then view the revisions by name and accept or reject each edit. Note that TeamReview won't work if you don't have an e-mail system (Lotus expects a fix in the next release.)

Although Freelance provides more multimedia templates than PowerPoint, it's not as easy to add special effects in Freelance. In PowerPoint, you click a button to add sound and animated effects; in Freelance you must add them yourself.

Unlike PowerPoint, however, Freelance enables you to distribute your presentations via the World Wide Web. (According to Microsoft, an Internet publishing tool will be available for both PowerPoint and Excel by the time you read this.)

FEATURES COMPARISON Freelance's Robust SmartMasters Win the Day

	PowerPoint 95	Freelance Graphics 96	Comments
Windows 95 support	Good job	Adequate	Lack of multithreading slows some Freelance operations.
Templates	Adequate	Good job	Freelance SmartMasters are more extensive.
On-screen help	Adequate	Adequate	Both products about equal in providing help.
Editing	Adequate	Good job	The InfoBox makes editing a breeze in Freelance.
Drawing	Adequate	Good job	Smart diagramming tools put Freelance ahead.
Workgroup tools	Needs work	Good job	Freelance's TeamReview provides better collaboration.
Outlining	Needs work	Good job	Freelance includes a live thumbnail view.
Slide sorter	Good job	Adequate	PowerPoint provides more editing features.
Rehearse mode	Good job	Good job	Similar rehearsal tools in each.
Multimedia	Good job	Adequate	PowerPoint's Animation Effects outshine Freelance.
Internet support	Needs work	Good job	Publish Freelance presentations to the Web.
Programming language	Needs work	Good job	PowerPoint lacks Visual Basic support.
Speed	Adequate	Adequate	Neither offers much improvement over prior versions.

Good job Adequate Needs work

Play or Pass?

Freelance Graphics 96 is an ideal choice for anyone who creates presentations. However, our performance tests show that, like PowerPoint 7.0, Freelance is slower than its predecessor. But, Freelance's new interface and content-rich SmartMasters make it a worthwhile upgrade.

—Richard Jantz

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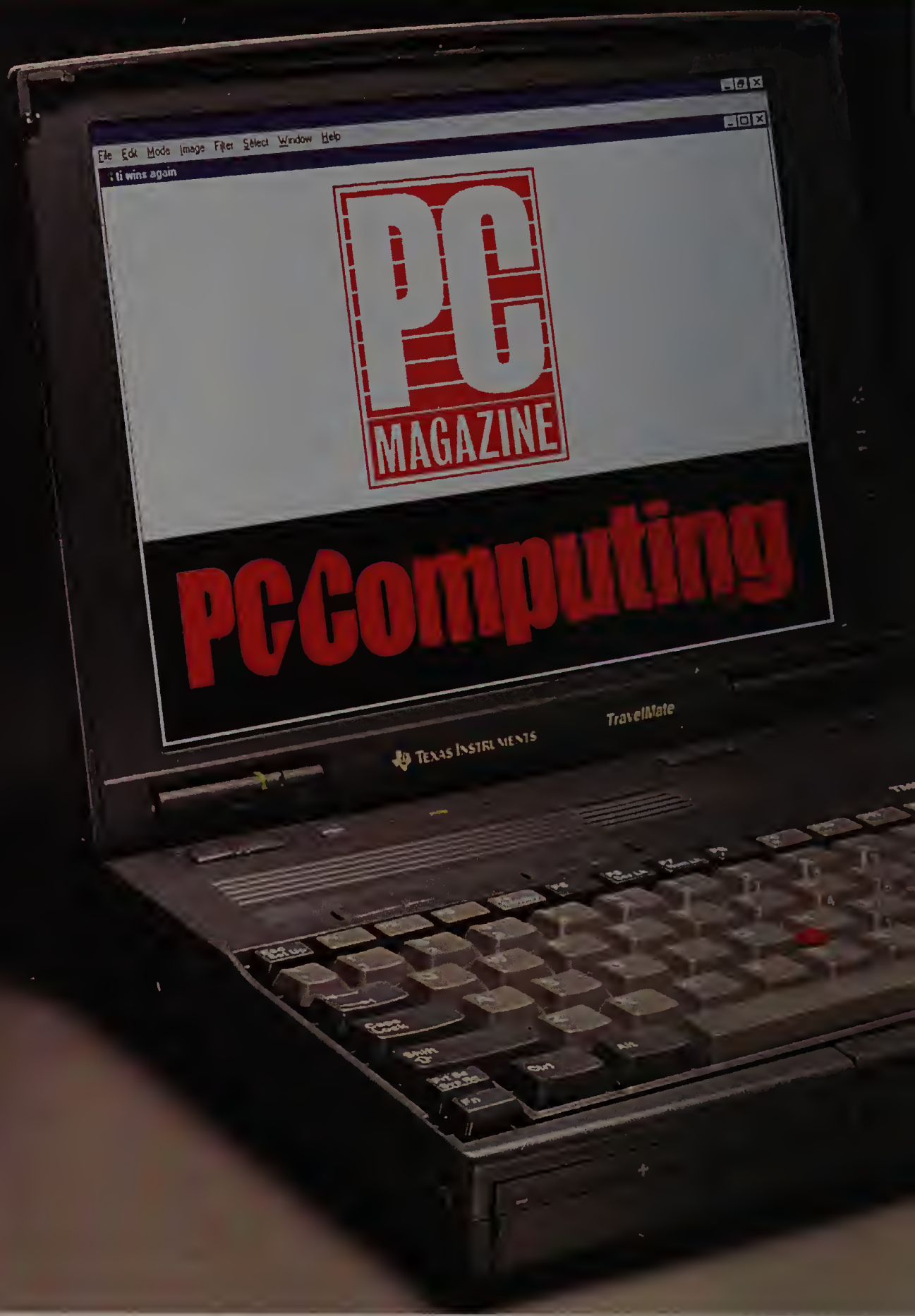

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SmartSuite 96 Lags Behind Office 95 in Usability

Task	Lotus SmartSuite 96	Microsoft Office 95	Comments (1=Worst 5=Best)
Sharing data among applications	3.1	4.3	Office 95 is the hands-down winner here. Linking a spreadsheet to a word processing document and performing a mail merge with a database file were onerous in SmartSuite 96.
Managing contacts and appointments	4.2	4.4	Lotus Organizer got slightly better marks than Schedule+ overall. However, keeping track of contacts in the Address drawer was confusing because the Address drawer and Organizer file aren't automatically linked.
Using program or file shortcuts	3.6	3.9	Although users found it easier to organize programs and files with the drawers in SmartSuite's SmartCenter, they found it more difficult to customize the SmartCenter than the Office Shortcut Bar.
Getting help	3.8	3.6	Even Office 95 users had to admit that SmartSuite's help is a little bit better than Office's.
Impressions of overall usability	3.7	4	It's a close call, but after completing our tests, even users who had previously tried SmartSuite preferred working with Office 95.

Methodology We asked eight typical users to perform a variety of common tasks and then rate how easy each task was to perform on a scale of 1 to 5. Each tester had experience with Windows 3.1 versions of SmartSuite or Microsoft Office. Two SmartSuite and two Office users were assigned to test each suite.

Sharing data among applications Tasks included linking a spreadsheet to a word processing document, editing the contents of a linked spreadsheet, performing a mail merge, and using each suite's compound document tools.

Managing contacts and appointments Tasks included using each suite's personal information manager to book an appointment, create a to-do item, locate a phone number, and add an address.

Using program or file shortcuts SmartSuite tasks included adding a SmartCenter drawer, assigning a program to a drawer, and adding an application to the SuiteStart toolbar. Office tasks included adding a folder to the Office Shortcut Bar and adding an application to the Programs Shortcut Bar.

Getting help Testers rated the suites' tutorials, context-sensitive help, and other features.

Impressions of overall usability Testers were asked to rate their experiences learning the suites, using suite features, and using the individual applications. The score is not derived from the ratings given for individual tasks.

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Approach 96

Much Better, but Still No Access

PROS: Savable search queries, increased programmability with LotusScript, security rights can be assigned to database files, increased Notes support
CONS: Limited speed improvements

Approach was unique as far as personal databases went. It was a step above simple flat-file database programs because it was relational, yet it wasn't robust enough to compete with the likes of Access. But now a new programming language, improved security features, and a slew of new time-savers team up to help Approach 96 finally compete more closely with Access. In a blow-by-blow features comparison, however, Access is still the more powerful database. Access is also faster; like its suitemates, Approach has slowed down. The only task in which Approach excelled was sorting.

Instant Database Success

One of Approach's strong points has always been the ease and speed with which users could create a database. Approach 96 makes it even easier with SmartMaster Applications, a collection of ready-made database apps that can help you manage everything from product orders business contacts to music collections. If you don't need an entire application, you can select from dozens of handy SmartMaster Templates, each consisting of an empty data file and ready-to-use forms and tables.

But Approach's SmartMaster Applications and Templates aren't nearly as flexible as Access's Database and Table Wizards. For instance, when you use a SmartMaster Application or Template to start a new project, you can't tailor the database as it's being created, as you can in Access. Instead, you have to modify the file structures, delete unwanted forms and reports, and remove the sample data after Approach has done its work.

Access has another unique setup feature that is especially helpful for database novices. You can create a new file by typing data directly into a *data sheet* (a table of rows and columns similar to a spreadsheet). When you save the file, Access assigns field types based on the characteristics of the data you entered. This feature, along with others, will likely extend Access's reach into the novice database user market that has long been Approach's domain.

Picks and Pans

The ability to save queries, always a standard feature in Access, was missing in earlier versions of Approach. Now, not only can you save queries, but Approach's new Find Assistant simplifies the task of building them. Although it's similar to Access's step-by-step Query Wizard, the Find Assistant is less structured and easier to use. You simply pick the type of query you want to create (a basic find, duplicates, top/bottom values, and so on) from within a single tabbed dialog box, define the selection criteria using simple drop-down menus, and then view a description of the query in plain English. You can switch to a different query type at any point simply by clicking the appropriate tab. By contrast, in Access you must choose a specific query wizard such as Simple Query Wizard, Find Duplicates Query Wizard, or Find Unmatched Query Wizard.

One annoyance: You'll find you still can't base an Approach report on a query, as you can in Access. When you want to report

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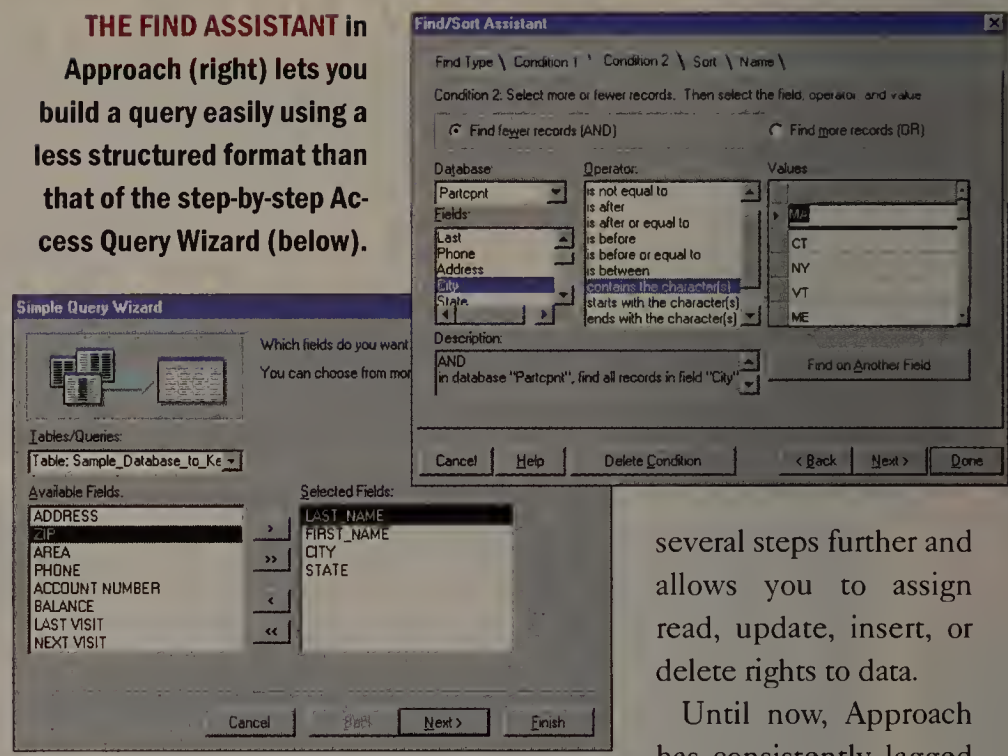
on selected records, you have to remember to activate the query each time you switch to the report view.

A Touch of SQL

Approach has always been adept at data access, allowing you to open and join files created in other programs. In Approach 96, you can access data from nearly any type of file format, including spreadsheets, other databases, and text sources. With the new SQL Assistant, you can formulate queries for SQL data directly from Approach. Although the SQL Assistant is easy to use, it is not as powerful as Access's SQL tools. Approach limits you to Select statements; Access allows more complex SQL commands.

On the spreadsheet integration front, both Approach and Access let you create forms and reports right from 1-2-3 or Excel, respectively. However, Access raises the bar a level by allowing you to attach a worksheet directly to an Access database. Such a feature effectively brings together the power of both products—combining the extensive calculation abilities of Excel with Access's data management prowess.

Lotus has also implemented its team computing strategy in Approach 96. With TeamSecurity, you can control access by assigning passwords, on either a group or individual basis, to the data and specific reports in your database. Access is more flexible, however. In Approach, you can only say whether a user can modify a database or use it in read-only mode. Access, on the other hand, goes several steps further and allows you to assign read, update, insert, or delete rights to data.



THE FIND ASSISTANT in Approach (right) lets you build a query easily using a less structured format than that of the step-by-step Access Query Wizard (below).

Until now, Approach has consistently lagged behind the competition in programming tools. Its macro facility was adequate for automating routine tasks, but it just wasn't flexible enough to handle custom database applications. Approach now includes LotusScript, an object-oriented programming language that lets you create custom applications. LotusScript is similar to Visual Basic in its complexity, but its simplified interface makes application development easier. Unlike Access, which uses separate windows for browsing, editing, and debugging scripts, the Script Editor provides a single interface for creating and editing scripts. In addition, the SmartMaster Applications contain plenty of code you can peruse to get familiar with the language.

Access Users Shouldn't Switch

For Access users who may be wondering if Approach would be a better choice for their database projects, the answer is no. Unless you've been struggling to get things going and really need the less complicated interface of Approach, you're better off sticking with Access and its bigger cache of tools. If you're already an Approach user running Windows 95 on a Pentium with plenty of RAM, the new Find Assistant alone makes it worth upgrading to SmartSuite 96 for this version of Approach. Otherwise, it's the same old story: It's better to wait for the next release to see if there's any improvement in performance.

—Celeste Robinson

FEATURES COMPARISON Approach Finally Competes With Access

	Access 7.0	Approach 96	Comments
Windows 95 support	Good job	Good job	Both products interact well with Windows 95.
Database templates	Good job	Good job	Both offer a multitude of templates.
Security	Good job	Good job	Great protection at group and individual levels.
On-screen help	Adequate	Adequate	Adequate in both.
Report design	Good job	Good job	Access has good help; Approach has single-click tools.
Cross-tabs	Adequate	Good job	A snap in Approach.
Query builder	Adequate	Good job	Approach is less restrictive than Access.
Data access	Good job	Good job	Both products handle a wide range of file formats.
Spreadsheet integration	Good job	Adequate	Access lets you attach a worksheet to a table.
Mail merge	Good job	Adequate	Access leaves the formatting to Word.
Programming language	Adequate	Adequate	LotusScript adds programming tools to Approach.
Speed	Adequate	Needs work	Approach still falls behind.

Good job Adequate Needs work

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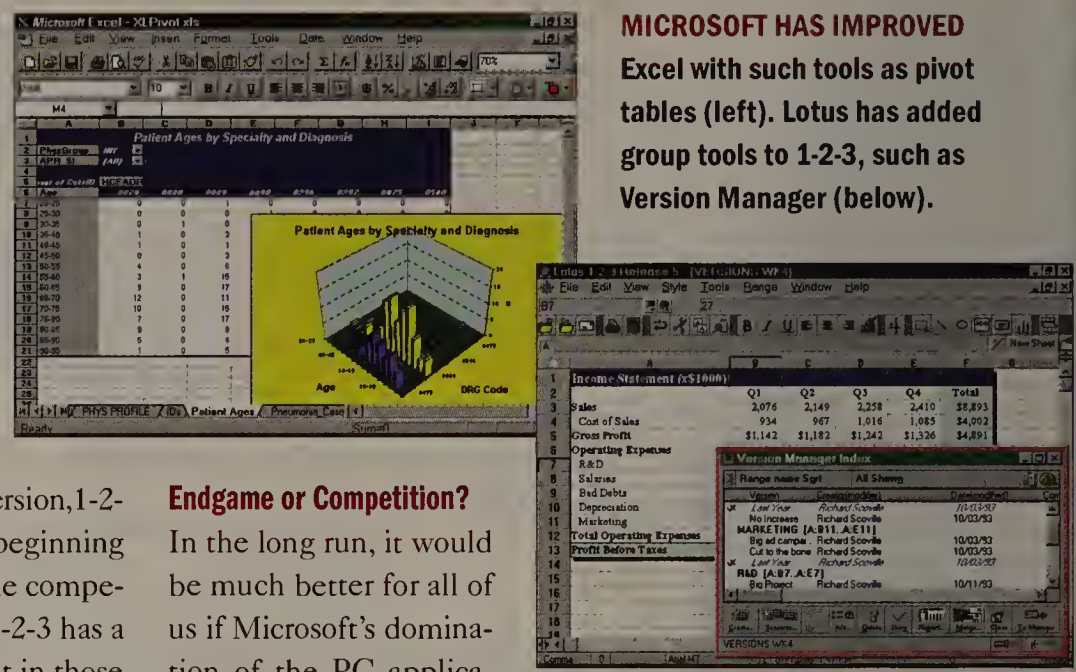
1-2-3 in Limbo

Can It Catch Up to Excel?



MICROSOFT HAS IMPROVED Excel with such tools as pivot tables (left). Lotus has added group tools to 1-2-3, such as Version Manager (below).

PROS: Easy-to-use graphs, ability to route worksheets to others, tracks multiple versions of worksheets
CONS: 16-bit application

Will 1-2-3 for Windows 95 transform the original spreadsheet from also-ran to industry leader? Frankly, it's a long shot. SmartSuite 96 ships with the old 16-bit version, 1-2-3 release 5. Compared to Excel 7.0 for Windows 95, it's beginning to look a bit long in the tooth. If Lotus plans to renew the competition, it has its work cut out for it. The one area where 1-2-3 has a shot at besting Excel is performance. Our tests reveal that in those tasks where Excel 7.0 was faster, it wasn't faster by much.

The Ever-Widening Feature Gap

Lotus and Microsoft have charted radically different courses in developing their spreadsheets over the past few years. While Microsoft has made steady progress improving the feature set and basic functionality of Excel, Lotus has concentrated on adding group productivity tools. 1-2-3 release 4.0 introduced the excellent Version Manager to facilitate group what-if modeling; Release 5.0 added range routing and better integration with Approach and Notes, and tossed in data maps for good measure.

But Lotus has neglected the fundamental improvements that would give users a compelling reason to upgrade. The fact is, Excel 7.0 surpasses 1-2-3 in most areas. In some cases, Excel provides components that are indispensable for building sophisticated worksheets. Excel's arrays permit efficient, formula-based solutions to a host of problems, and range names with formula references, along with the offset() function, give Excel users more flexibility in creating worksheets. Microsoft has also implemented similar features more thoroughly. For example, 1-2-3's cross-tabulation feature doesn't approach the versatility of Excel's pivot tables.

Building on Strength

Yet 1-2-3 does have some notable strengths to build on. Its graphs, though lacking features such as curve fitting and error bars, are easy to create and edit. Its 3-D worksheet structure is the most coherent of any spreadsheet available today, and the database query tools offer useful methods for extracting records from a database. The Version Manager is a uniquely useful tool, and along with range routing and tie-ins with Notes, 1-2-3 permits development of applications that can't be duplicated in other suites.

Judging from the advance information available so far, improvements planned for 1-2-3 for Windows 95 will build on these core strengths: TeamConsolidate will allow multiple users to edit copies of a worksheet and then combine them into an integrated model. Other improvements include the InfoBox, an outlining feature, and new assistants to simplify tasks. LotusScript, a programming language that will rival Microsoft's VBA, will also be included.

Endgame or Competition?

In the long run, it would be much better for all of us if Microsoft's domination of the PC applications market were challenged by vigorous, creative competitors. But when it comes to spreadsheets, Microsoft has raised the bar very high. To engage the hearts and minds of spreadsheet users, 1-2-3 for Windows 95 must not only continue its workgroup strategy, it must also offer credible responses to Excel's major innovations. Can Lotus do it? I'm looking forward to the beta.

—Richard Scoville

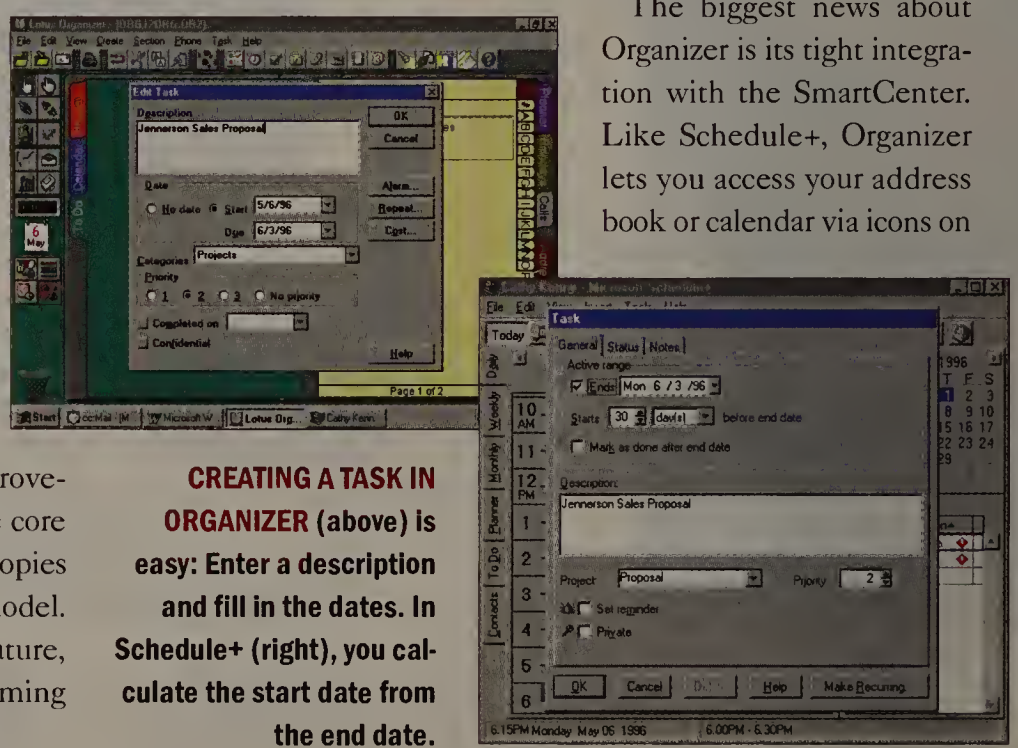
Organizer 2.1

Tired but True

PROS: Link related items between sections, record text in Notepad section, add contacts and appointments from the desktop via the SmartCenter
CONS: 16-bit application

Poor little Organizer. Maybe we ought to start calling it Cinderella. Without the attention lavished on its SmartSuite stepsisters, Organizer, like 1-2-3, is starting to look a bit dated. Yet it still holds its own in this suite and even surpasses Schedule+ in functionality.

The biggest news about Organizer is its tight integration with the SmartCenter. Like Schedule+, Organizer lets you access your address book or calendar via icons on



CREATING A TASK IN ORGANIZER (above) is easy: Enter a description and fill in the dates. In Schedule+ (right), you calculate the start date from the end date.

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the SmartCenter. But unlike the Office Shortcut Bar, which merely launches Schedule+, the SmartCenter lets you add an appointment or book a contact right from the desktop.

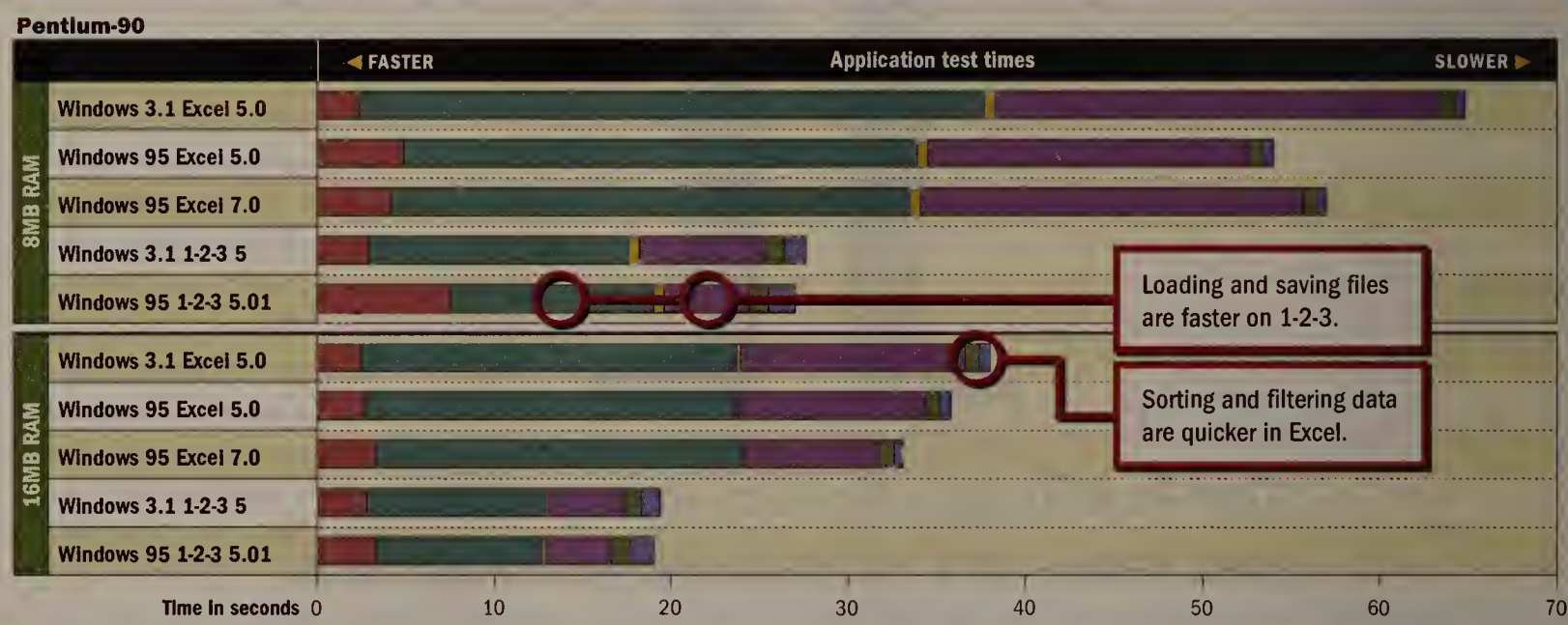
Organizer 2.1 and Schedule+ also differ in some basic tools. You can record free-form notes in the Notepad section; you can also create links between any items in your file, such as to-do items or phone calls with contacts in the Address Book. On the other hand, the task manager in Schedule+ is as sophisticated a project planner as you might ever need, with percent-complete and delegation features. Organizer's planning tool is much simpler, resembling a fold-out calendar more than it does project management software.

A Better Version on the Way?

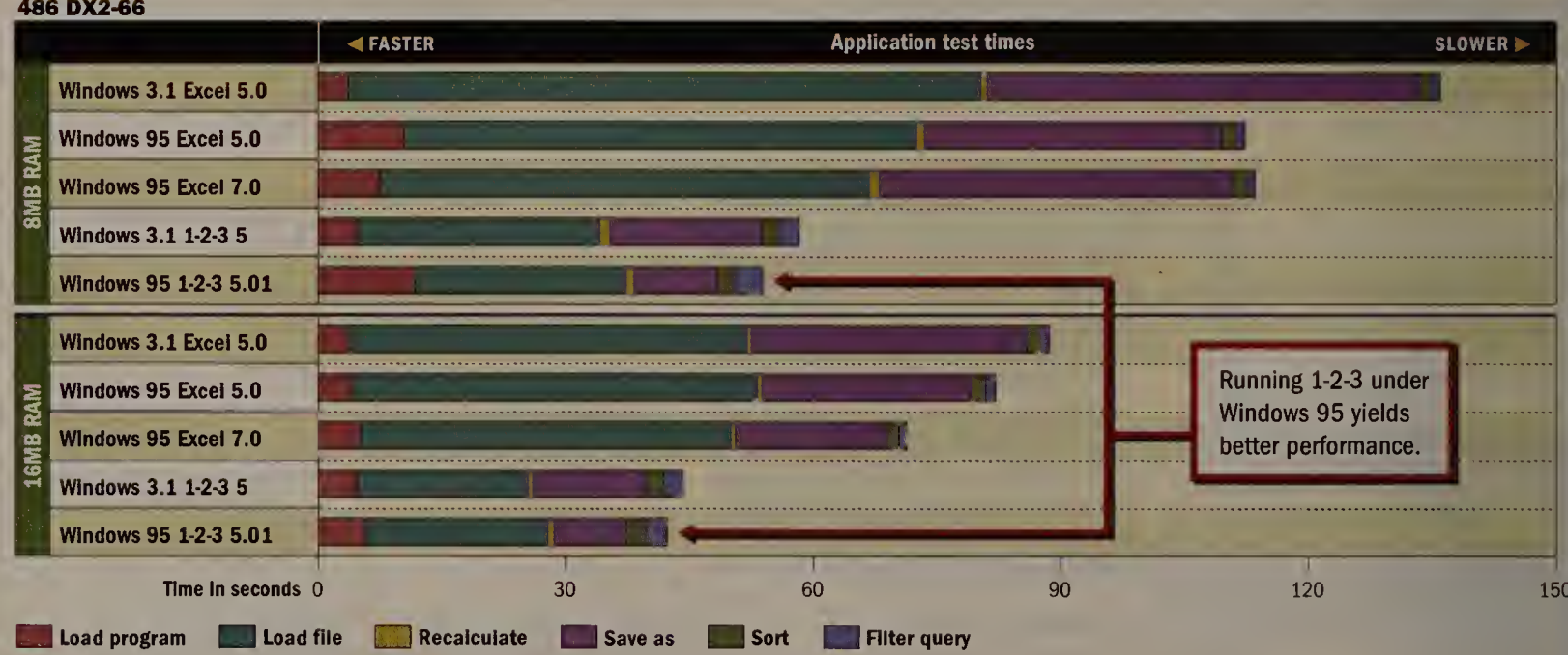
A Windows 95 version of Organizer, called Organizer 97, should be available by June. However, Organizer 97 will not include group calendaring and scheduling functions. Instead, you'll have to wait for an as-yet-unnamed product, due to be released in the third quarter, for those features. Notes 4.2 (due sometime midyear) will also include a calendar and scheduling application. While this is welcome news for Notes users, the implications for Organizer users are unclear. In any case, Organizer is still one of the best PIMs around, despite lagging behind its Windows 95 companions.

—Peter Scisco

TEST REPORT 16-bit 1-2-3 Version 5.01 Puts up a Good Fight Against Excel 7.0



TEST REPORT Performance on a 486 Drops in 1-2-3 and Excel



For methodology, see "Word 7.0 Shows Some Improvements, but Word Pro 96 is Just Plain Slow."

Spreadsheets We loaded a 3.5MB file composed of 10 worksheets, each containing formula links to other sheets in the file. We then changed a cell value and timed how long it took for a linked cell on another sheet to recalculate. We then saved the worksheet. We sorted a 2000-record table on a single sort key and filtered the table on one key for a 50-record subset. **Data based on tests designed and conducted by the PC World Test Center. All rights reserved.**

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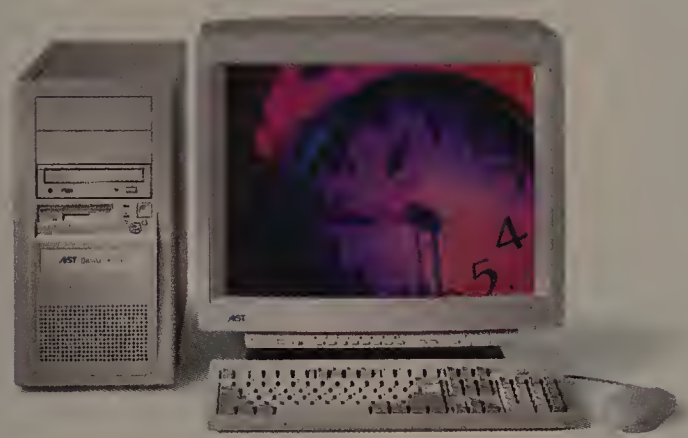

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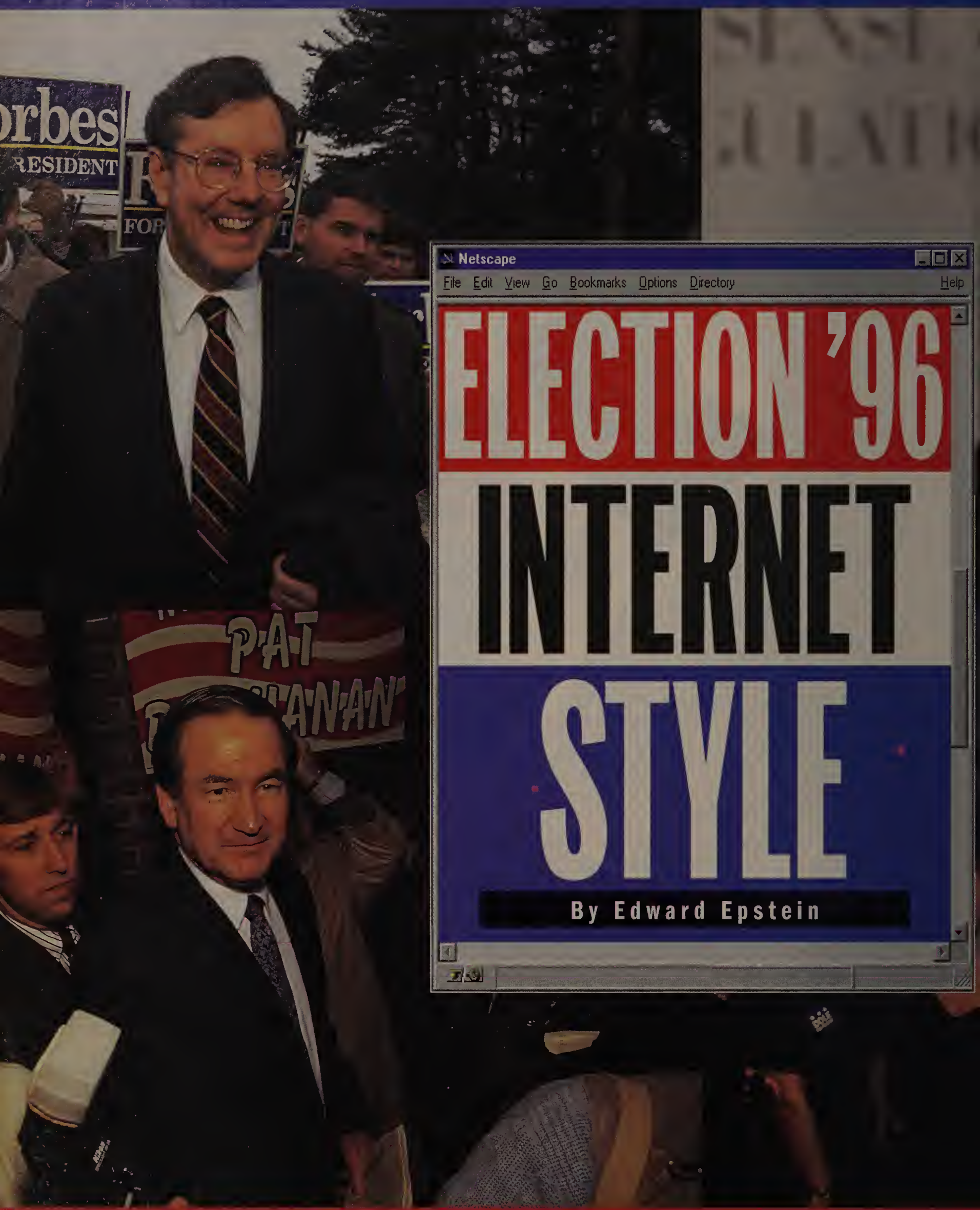
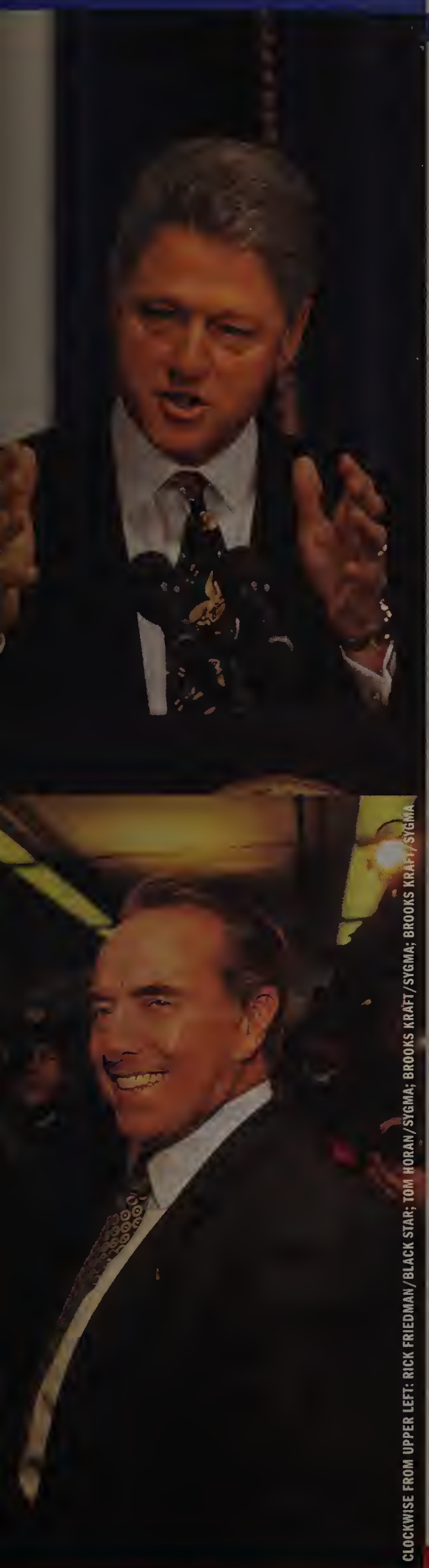


ELECTION '96 INTERNET STYLE

By Edward Epstein



CLOCKWISE FROM UPPER LEFT: RICK FRIEDMAN/BLACK STAR; TOM HORAN/SYGMA; BROOKS KRAFT/SYGMA; BROOKS KRAFT/SYGMA

Net-savvy candidates have a powerful new medium for reaching an educated, high-income electorate. Trouble is, they don't know what to do with it.

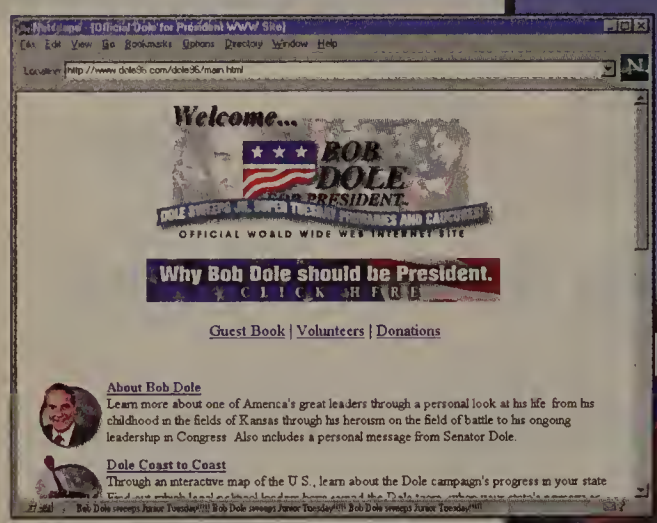
In 1932, Franklin D. Roosevelt transformed U.S. politics by flying to Chicago and accepting the Democratic Party's presidential nomination over the newest mass medium, radio. In 1960, Richard Nixon and John F. Kennedy redefined presidential campaigns when they squared off for their first televised debate.

Click forward to 1996.

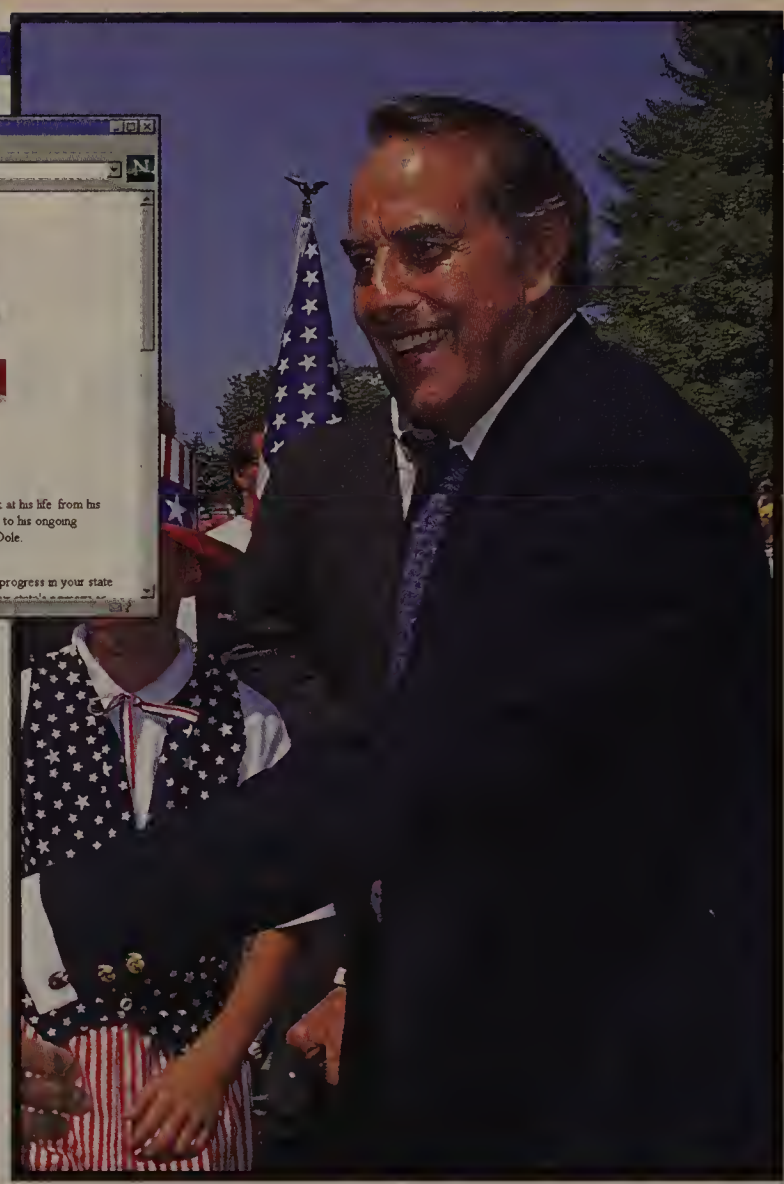
The U.S. election process is on the verge of a new technological era. The Internet is spreading like crabgrass, and politicians are taking note. With the World Wide Web, candidates and their managers have found an effective new way to reach educated, high-income citizens—exactly the kind of people who are most likely to vote. Better yet, they can address the electorate directly, without going through what they see as prying, nay-saying reporters with a nasty habit of pointing out candidates' flip-flops and half-truths.

"1996 is the test-drive year for politics on the Internet," says Gary W. Selnow, a professor at San Francisco State University's School of Business. Selnow is researching a book on the topic, although he doesn't plan to begin writing until after the November election. "The real rollout will be in the year 2000. But the '96 campaign will shape it, sculpt it," he adds.

So far this year, it seems as if everyone is getting into the act. Candidates for the presidency and other offices are littering the Web



Republican candidate Bob Dole campaigns on the Web.



with their sites, hoping to gain votes and volunteers with sound bites, pictures, and occasionally position papers. The news media have also joined in, bringing analysis and political gossip to their own sites. And in a world where the political hard sell appears to be the only rule, you can even find reasoned, nonpartisan information from groups that want to see an informed electorate.

Messages and Propaganda

By definition, official campaign Web sites are one-sided and sanitized, extolling all their candidate's virtues and mentioning none of the shortcomings. Consider the site of Senate Majority Leader Bob Dole (http://www.dole96.com)—one of the best candidate sites on the Web. In addition to all the stuff a visitor would expect—Dole speeches and position papers, and a pitch for funds and volunteers—there are trivia quizzes, audio and video clips, and even screen savers and wallpaper for downloading. Users can create their own "Dole for President" posters and send postcards to friends telling them about the site.

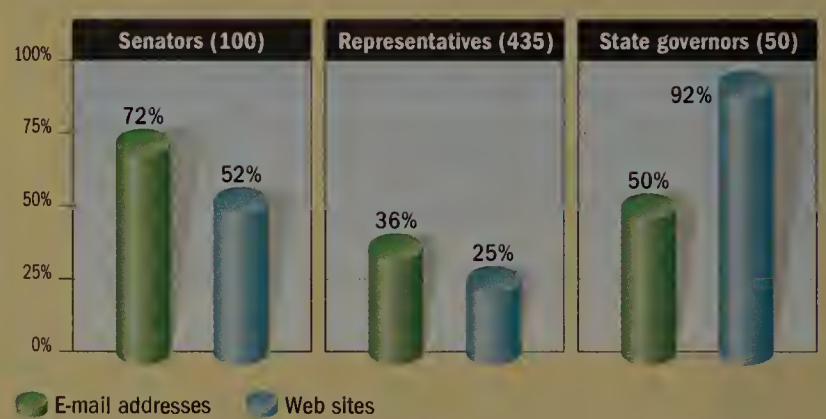
President Clinton has yet to roll out a campaign site (with no significant opponent running against him in the primaries, why should he?), but he already has a powerful presence on the Net. Showing what a huge advantage incumbency can be, Clinton and Vice President Al Gore are the leading men of the august White House home page (http://www.whitehouse.gov), one of the most popular sites on the Web. Technically the site is nonpartisan, since it was created with taxpayers' money, but you never really doubt who the stars are.

In addition to the candidates' sites, the parties have their own Web sites. The Republican National Committee page (http://www.rnc.org) is the most visually sophisticated, with a virtual Main Street—click the newsstand, for instance, and you'll get a list of official Republican Party publications. On the other hand, the Democratic National Committee's Web site (http://www.democrats.org) features a "Newt Gingrich hangman's game" plus the more pedestrian online petitions and factual information. "We've been very aggressive on the Internet," says DNC spokesperson David Seldin.

The candidates and their handlers are fishing for more than votes—and some of them are catching volunteers. In the Dole site's first two months online, more than 700 Web surfers signed up to work for the senator's campaign. It's an "important measure of how effective our site has been," says Dole press secretary Nelson Warfield. RNC spokesperson Virginia Hume says that more than 8000 people signed the site's guest book in its first few months of operation, and 2500 have been added to the party's mailing list. According to the DNC's Seldin, "Some [citizens] aren't plugged into traditional political networks but are plugged into the Internet. We're getting a lot of new people."

How Wired Is the Government?

In a perfect online world, all elected officials would have e-mail addresses and their own World Wide Web sites. Slowly but surely, we're getting there.



PC World has put elected officials' e-mail addresses and URLs online (http://www.pcworld.com/may96/politics, or send e-mail to politics@pcworld.com).

Virtual Campaign Offices

The sites may prove useful to the candidates and their organizations, but do they really further political debate? Are the candidates giving us anything more substantial than slow-motion versions of their 30-second campaign commercials? "Their home pages are like campaign offices, waiting for people to come in," says Jim Warren, a Northern California computer activist and champion of the First Amendment. According to Warren,

IRA WYMAN/SYGMA

the sites don't even measure up to TV commercials. "A commercial reaches out to viewers" by the millions, he argues, while a home page attracts few who aren't already well disposed toward the candidate. "What a waste!"

Warren contends that campaigning on the Internet will not live up to its full potential until candidates go beyond viewing the medium as another advertising opportunity and open themselves up to participating in genuine online debate. But he doesn't think it will happen easily. "Openness poses a problem for traditional campaign managers," Warren points out. "They want to control the campaign's message."

Warren recommends that campaigns employ staffers or volunteers to spend time on relevant newsgroups, talking up the Web sites and posting the candidate's position papers. He also suggests that the campaigns

The Republican Party's Web site has added thousands to the party's mailing list.

send messages to moderated mailing lists on various issues. "This is like direct mail, but much more targeted," he says.

But what Warren would really like to see is presidential candidates engaging in an ongoing online debate. The candidates themselves or staff members could discuss issues and answer questions from other candidates or voters. But such a proposal would require candidates to adopt a degree of openness that they increasingly seek to avoid.

One early attempt to hold a real online debate ran afoul of federal election laws. Last November, CompuServe proposed offering free accounts to all candidates for state or federal office. This would have

ILLUSTRATIONS: TIM CARROLL; FORBES PHOTO: BROOKS KRAFT/SIGMA

Online Guide to Election '96

Want to get involved electronically with the election? Here are some places to start and ways to obtain information.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Official Government Web Sites

The White House

This hugely popular site is an interactive citizen's handbook. You can familiarize yourself with the president's Cabinet and multiple federal agencies, and check out the president's official pronouncements (http://www.whitehouse.gov).

The U.S. Senate

Read about the Senate's members, history, committees, procedures, and legislation. Check out the tour of the Capitol. There may be an events calendar by the time you read this (http://www.senate.gov).

The House of Representatives

This site provides access to legislation, as well as information about members, committees, and organizations of the House. You can also check out related links to other U.S. government information resources (http://www.house.gov).

Thomas

Search this extensive official library service of the U.S. Congress for the full text of all versions of House and Senate bills. Using its search options, you'll also find information about Congress, the law-making process, and other Library of Congress government resources (http://thomas.loc.gov).

Candidates' Sites and E-Mail Addresses

Harry Browne (Libertarian)

http://www.rahul.net/browne; campaign@harrybrowne96.org or browne@rahul.net

Pat Buchanan (R.)

http://www.buchanan.org; no e-mail address

Bill Clinton (D.)

president@whitehouse.gov or clinton@whitehouse.gov

Bob Dole (R.)

http://www.dole96.com; no e-mail address

Steve Forbes (R.)

http://www.forbes96.com; forbes@forbes96.com

Political Party Sites

Democratic National Committee

http://www.democrats.org

Libertarian Party

http://www.lp.org/lp

Republican National Committee

http://www.rnc.org

Nonpartisan Sites

All Politics

This joint venture of CNN and *Time* magazine brings you news "bytes," articles from *Time*'s archives, press releases, and a virtual primary where you can cast your vote. Check out the Candidate Rate-o-Matic, where you can match your views with those of a politician (http://allpolitics.com).

All Things Political

Produced by the *Washington Weekly* electronic newsmagazine, this site offers detailed portraits of the contenders, speeches by Clinton and Gingrich, opportunities to pass judgment on assorted scandals, opinion polls, and some well-chosen links to other political sites (http://www.federal.com/political.html).

Congressional Quarterly's American Voter '96

This electronic newspaper offers nonpartisan and authoritative coverage of all political issues. The Election 96 area was still under construction at press time, but it already had biographical and campaign profiles of each candidate. This site also includes regional political news (http://voter96.cqalert.com).

American Voter '96 reports a big Dole victory.

Countdown '96

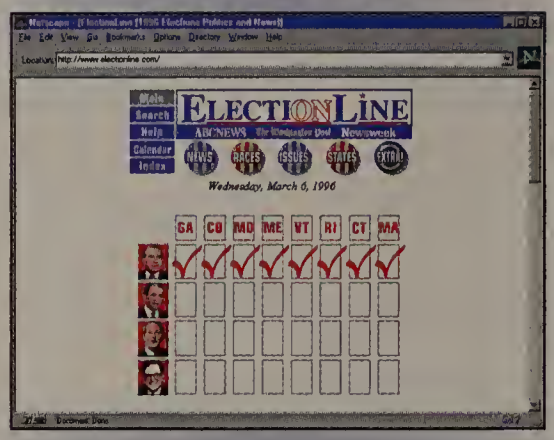
This is a fairly comprehensive resource for information on parties and candidates, issues, and activist groups. It offers links to topics on propaganda, opinion, and analysis, plus places to voice your opinions and track candidates. There's also a quiz page and political humor (http://comeback.com/countdown).

Doonesbury Electronic Town Hall

Twenty-seven years after revolutionizing the comic strip, *Doonesbury* hops on the Web with information and laughs. Still under construction as we go to print, *Doonesbury* offers a daily briefing, straw polls ("even if they are meaningless"), soapboxes for you to jump on, and a search engine for locating past *Doonesbury* strips (http://www.doonesbury.com).

Election '96 Home Page

Here's "a nonpartisan Internet resource center" with an extensive range of links to related sites: candidates and their home pages, election resources, information on prominent issues, and Usenet newsgroups. This is a very good place to start (http://dodo.crown.net/~mpg/election/96.html).



ElectionLine shows Dole's sweep graphically.

ElectionLine

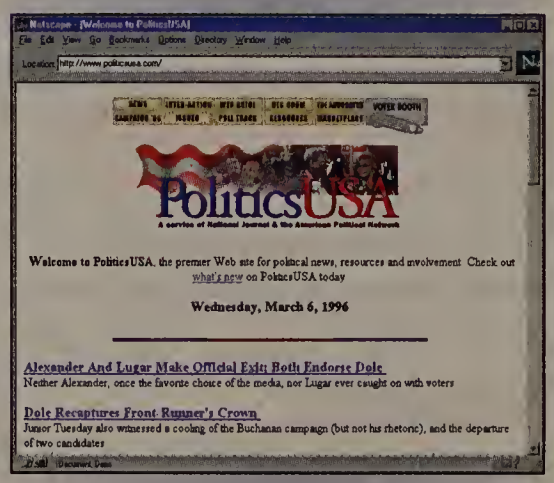
ABC News, the *Washington Post*, and *Newsweek* join forces to provide extensive political coverage in what is expected to be one of the largest Web sites ever developed. Still compiling information as we go to press, ElectionLine promises to offer the latest campaign news, issues, press commentary, and primary results. Look also for user participation and access to pertinent audio and video clips (http://www.electionline.com).

PC World Online

Want to know if your senator, U.S. representative, or governor has a Web site or an e-mail address? Would you like to know what it is? *PC World* has compiled a list of elected official sites and addresses. You'll find them on the Web at http://www.pcworld.com/may96/politics, or by sending e-mail to politics@pcworld.com.

PoliticsUSA

This is a leading Web site for political news, resources, and involvement, catering both to reporters and to political junkies obsessed



PoliticsUSA tells us about the losers first.

given them access to all the service's forums and chat rooms, plus the Internet. "We saw it as a place for them to explain their platforms and talk directly to people," says CompuServe's Daphne Kent. But CompuServe was scared off by a wire service report quoting a spokesperson for the Federal Elections Commission as saying that the offer would amount to an illegal in-kind campaign contribution. CompuServe put its plans on hold and asked for an FEC ruling.

If the idea is approved, Kent says, CompuServe would "want to do an online conference with the candidates."

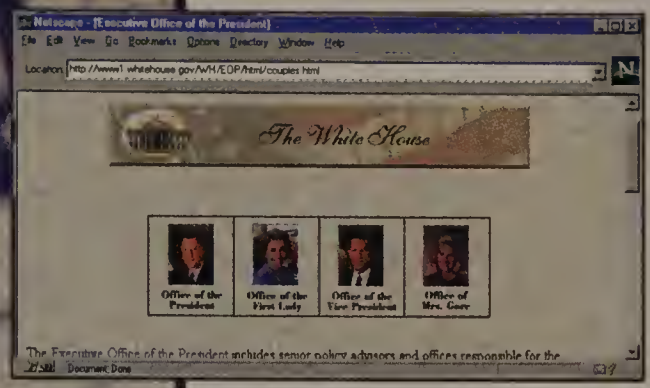
Warren has proposed a similar program. He's interested in forming a network of home pages put together by major newspapers, on which candidates could engage in a running debate over a period of days or weeks. He'd also like to set up newsgroups where political reporters could offer running

It lacks a Main Street, but the DNC's site keeps Democrats connected with their party.

commentary on what the candidates are saying, and voters could comment on the candidates and the journalists.

Keeping Control

But a freewheeling debate, one that would subject candidates to unfettered questioning from their opponents and voters over an extended period, runs directly counter to the current trend in American politics. Today, presidential candidates limit their appearances to carefully controlled public events and a few almost as well controlled "debates," for which they cram like college students before a final exam. But if people like Warren succeed in steering the Internet



Officially nonpartisan, the White House site still manages to promote the president and VP.

toward open debate, candidates may be forced to change their ways.

Is this likely? Why should a political system so adept at limiting debate on television allow it online? It may not have a choice. Whereas TV is controlled by a few huge corporations, the Internet still consists of millions of autonomous sites. And the Internet's constituency, which is estimated at 12 million Americans of voting age, consists largely of well-educated, prosperous citizens. These may be just the people who want to get beyond slogans and deep into the nitty-gritty of candidates' positions.

If they want to be able to reach these people, campaigns may have to open up and be willing to take a few risks. "It will be interesting to see if the Internet produces a structural change in the circuitry of politics," says John Nerone, a historian of communications at the University of Illinois at Urbana-Champaign. "Will it cut out journalists" by allowing for direct contact between politicians and voters? "And will it further erode the role of political parties [as radio and television did]?"

Left in the Dust

But if the Internet becomes vital, what does that mean for America's poor, who are less likely to have Internet access and who already vote in smaller numbers than other groups? "A lot of people are going to be left in the dust on all of this," says Professor Selnow. "You have to remember that 30 percent of people are still without cable TV. It will be a long time before everyone has the type of online access we would like to see." But Warren disagrees. "Using that rationale, we shouldn't publish books because the poor can't afford books. We can put PCs in libraries and community centers for people to use. Anyone who wants access to the Net can get it."

No Comment: Politicians Tackle the Issues

How do the presidential candidates feel about controversial computer and technology issues like Internet censorship, electronic privacy, and ergonomic standards? *PC World* assigned me to find out. What I discovered is that when you ask a politician a direct question, you get no answer at all.

Over the course of a month, I faxed questionnaires, called to follow up, refaxed, called, waited, called again, faxed again, asked nicely, begged, threatened—all to no avail. To be fair, some lesser-known candidates—Libertarians Harry Browne, Irwin Schiff, and Rick Tompkins, and Republican Morry Taylor—did cooperate. But the big-league candidates had no interest in sharing their views.

President Clinton couldn't respond, his office said, because he had not officially declared his candidacy. Buchanan and Lamar Alexander declined to participate, pleading lack of resources. Senator Dole's office never committed one way or the other. Forbes ignored us entirely.

Phil Gramm, before he dropped out of the race, was our one ray of hope: For several weeks campaign workers assured us that responses were forthcoming. What finally arrived was a sheaf of position papers on the budget, crime, welfare, and the like. About technology, we got a luxurious two sentences in the cover letter explaining that the senator is against "prohibitive restrictions [being] placed on the Information Superhighway," and that he supports "the provisions contained in the Telecommunications Competition and Deregulation Act of 1995, which protect innocent children and other telecommunications device users from unwanted exposure to obscene material." In other words, Gramm was against government intrusion except when he was for it.

Apparently, though, we were not alone in not getting answers. Clinton, Dole, and Forbes all refused to participate in Project Vote Smart's National Political Awareness Test, a survey soliciting opinions on issues in 27 categories. Perhaps today's politicians follow Honest Abe's advice: "Better to remain silent and be thought a fool than to speak out and remove all doubt." *—Angela Freeman*

PHOTO: LARRY DOWNING/SYGMA; ILLUSTRATION: TIM CARROLL

with Washington politics. PoliticsUSA has joined forces with Lexis-Nexis to provide campaign coverage from around the nation. It offers an updated election overview, related articles from the press, and a broad range of links to other sites covering the election (http://politicsusa.com).

Road to the White House

Can't wait for November? Stop by the Virtual Voting Booth and cast your vote for the candidate of your choice. You'll also find plenty of links (http://www.ipt.com/vote).

Vote Smart Web

Aimed at journalists but accessible to anyone, Vote Smart Web provides the latest information on candidates, lobbying groups, and government information sources. This is a great place to search out facts (http://www.vote-smart.org).

General Political Discussion Newsgroups

Want to argue with strangers you'll never have to meet? Here are a few places where you can voice your opinion: alt.president.clinton; alt.news-media; alt.politics.usa.republican; alt.fan.rush-limbaugh.tv-show; alt.politics.usa.newt-gingrich.

Online Services

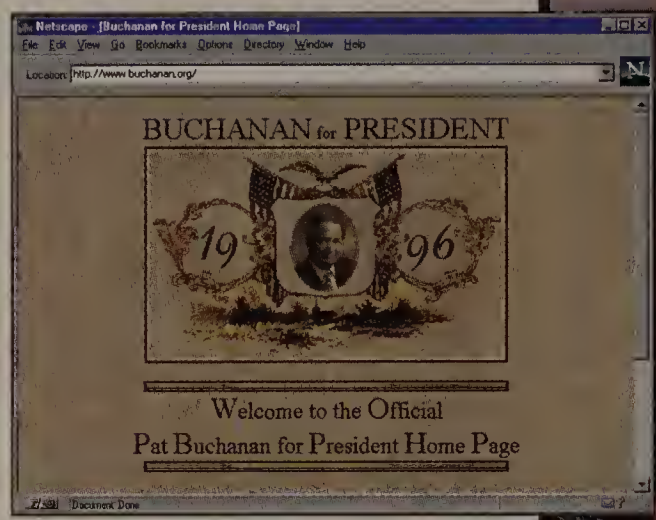
America Online: Decision 96

AOL is offering up-to-date news and photos, profiles of candidates, links to Web sites, and information on how to volunteer. There are speeches to download, a selection of *Atlantic Monthly* articles, and 50 topic areas on the message boards (AOL keyword: election).

CompuServe: Election Connection

CompuServe gives up-to-the-minute news on candidates, dates of appearances, speeches, links to candidates' Web sites, and frequent polls. Read what people are saying in the US Party and Debate forums and Issues Forum (CompuServe go command: election).

—Aoife McEvoy



Pat Buchanan's Web site drapes itself in an old-fashioned, flag-waving motif.

Of even more far-reaching consequence is the possibility of electronic town meetings that could sample public opinion and perhaps even decide national policy. Such a development could dwarf the recent trend of lobbying groups and radio talk show hosts calling on citizens to flood government offices with faxes, e-mail messages, or phone calls to push elected officials to act on specific issues.

Such "meetings" haven't happened yet, but on a local level, online democracy is taking root. Dozens of cities, many grouped together as Free-nets under the umbrella of the Cleveland-based National Public Telecomputing Network, help people do business with city hall, engaging in online conversations with public officials.

Not that city leaders are necessarily happy about the process. According to Gail Featheringham, director of teledemocracy at the network, "a lot of politicians are scared to death of this. They don't like to make immediate responses to people."

Among those championing the concept of electronic town meetings are futurists Alvin and Heidi Toffler in their recent book *Creating a New Civilization: The Politics of the Third Wave* (Turner Publishing, 1995, 404/885-4114): "Using today's far more advanced computers, satellites, telephones, cable, polling techniques, and other tools, not to mention the Internet and other communications networks, an educated citizenry can for the first time in history begin making many of its own political decisions."

Such a suggestion dismays others. "I would be horrified to see...a national town meeting," says Warren. "These would be much too susceptible to demagoguery."

"We live in a republic," adds Selnow. "The Founding Fathers established a republic for a damned good reason. Not everyone can be informed on every issue. That's why we elect people." Online democracy, he warns, would result in some "very dangerous, stupid decisions." But Selnow says he isn't going to lose any sleep over such a possibility. "Even if online voting happens, I won't live to see it. This would be way off in the future."

Politicians have long known how to use radio and television to their benefit—the 30-second commercials, the even shorter sound bites timed for the evening news—and there's no doubt that they'll become just as adept at using the World Wide Web. But if a few determined citizens work hard enough, they could also make the Net a safe place for meaningful political dialogue. And that would benefit everyone.

Edward Epstein is a political writer for the San Francisco Chronicle. *Angela Freeman is editorial researcher and Aoife McEvoy an assistant editor for* PC World.

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THE TOP 20

PC WORLD

Power pg. 190
Budget pg. 200
Notebooks pg. 206

Of note in this month's Top 20 review: A slew of new Pentium-166 PCs, fast 6X CD-ROM drives even on budget PCs, notebooks with 12-inch screens and gigabyte hard drives, and a growing clamor over tech support.

Pentium-166 : The

Dell Dimension XPS P166c: With a PC WorldBench score of 208, it's still the fastest PC.

WinBook XP5 P120: The biggest hard drive, the longest battery life on power notebook chart.

Dell Latitude LX 4100D: Low-priced Best Buy with long battery life.

Dell Dimension P75t: Longtime budget Best Buy hits number one.

Pentium-166 PCs are gradually gaining a foothold on our Power chart, despite the fact that most prices remain fairly high. This month three of the five new systems on the list are P-166s, from HP, Dell, and NEC. Most P-166s still cost more than $3500, but we're beginning to see some good deals. For instance, with a price cut of $149, Micron's $2999 P166 Millennia becomes the first P-166 we've tested to drop below $3000. You can get lower prices on some of the other six Pentium-166s on our list (which range from $3400 to $4600) by configuring your system with less RAM and storage.

New Standard of Power

Several major vendors—including Dell, Micron, and Gateway—have begun shipping most of their desktop systems with 6X CD-ROM drives. (At press time, Dell's high-end OptiPlex line still carried the 4X CD-ROM drive as the standard.) Word has it that 4X drives will be phased out across the board by the end of the year. Faster CD-ROM drives mean smoother audio and video for multimedia presentations—but if you're working with mainstream consumer titles and games, many of which are designed to work adequately even on 2X CD-ROM drives, you might save a little money by purchasing your system with

By Melissa Riofrio

a quad-speed CD-ROM drive. For instance, at press time a Dell Dimension system would cost $100 less if you requested it configured with a 4X CD-ROM drive.

Reader Feedback Sways the Top 20s

Computer companies' reliability and service scores, based on fax-back responses from our readers and our own research on service and support policies, count for 40 percent of our overall rating for desktops. So our charts will record small ups and downs over time, such as the 2-point drop in Compaq's service rating this month. It's still a good score, but it could sink lower depending on what we hear from readers who have bought the latest Presario line of multimedia home PCs (the 5200, 7200, 7600, 9200, and 9600 series). Compaq has cut free support to the bone for these new models—you now pay $35 per question even for installation and configuration problems. According to Compaq public relations manager John Sweney, ProLinea and DeskPro owners will continue to get unlimited free help with hardware and software because so few of them call for support. Says Sweney, "Our commercial customers generally have their own help desks and IS departments [to handle questions]," unlike the Presario line's home users. Sweney recommended that Presario customers take their problems to one of Compaq's numerous online forums to get a response within 24 hours at no cost. But a sampling of messages that *PC World* culled from several Compaq forums suggests that getting quick help from Compaq these days—paid or online—is a dicey proposition at best (see this month's *Consumer Watch* for full details).

We looked at three new Presarios this month—the 9240, a $3393 P-133; the 9250, a $3094 P-150; and the 9660, a $3593 P-166—but none of them made the chart. All are nicely configured and elegantly designed, but they performed dismally. The P-166, for example, turned in a PC WorldBench score of 164—about the speed of the average Pentium-120 running our test suite.

A couple of errors in information we received from the vendor caused the HP Vectra VL Series 4 5/133 to drop ten rungs in the Power chart. We downgraded the company's service rating 5 points after we discovered it offers only 11 hours of technical support each weekday, not 24 hours as HP had previously reported. Though still quite good, HP's service rating is now the lowest on the Power Desktops Top 20. We also discovered HP had priced the Vectra VL Series 4 5/133 without a monitor; with a monitor, its price rose $418. Due to an editing error, we mistakenly reported in April that Dell had slashed almost $800 from its Dimension XPS P166c. In fact, the $4299 price for this PC configured with 32MB of RAM has dropped only about $150. As a result, it lands in seventh place on the Power chart this month, no longer a Best Buy.

A Notebook That's Also a Printer

The most interesting notebook this month, Canon's NoteJet IIIcx, didn't make the chart, largely due to its $6699 price and 2.3-hour battery life. But its 11.4-pound chassis houses a color ink jet printer and a monochrome scanner. The output isn't the best, but you can't beat the convenience.

Melissa Riofrio is an associate editor for PC World. *She can be reached on PC World Online (see page 14 for contact information).*

Senior Associate Editors Rex Farrance and Harry McCracken and freelance writer Jon L. Jacobi contributed to this article. Testing by Dave Casini and Ulrike Diehlmann; research and support by Andrew Hawn and Julian Weatherby.

For more information about all products in this article, circle reader service no. 907.

It All Adds Up: The Top 20 Overall Rating

Buying a computer involves numerous complex decisions. There's price, of course—how much should you spend? And how fast a CPU should you choose? How much RAM and what size hard drive? And what about the type of monitor, the software bundle, and the vendor's support policies? Then there are the amenities like sound card, speakers, modem, and CD-ROM drive. How can you be sure it all adds up to a good machine?

That's where our Top 20 overall rating comes in. We look at everything, down to the nitty-gritty details you might not think about, like number of free expansion slots and drive bays, and quality of documentation. We give brownie points if a case has easy-open latches that let you access the interior without using a screwdriver. With notebooks, we check for extras like a carrying case included with the price, or a time-out feature that disables itself when you use AC power. With 35 or more systems to test each month, we can't examine all components in depth (for instance, we don't put a system review desktop's monitor and modem through the same rigorous tests we run for our Top 10 Monitors or Modems reviews), but we do check all the items that factor into our ratings.

For desktops, the overall rating comprises performance (our PC WorldBench score), price, features, reliability, and service and support. For notebooks, we add design, battery life, and weight. Price and reliability count the most when we score budget machines; for power contenders, we weight performance and reliability most heavily. (For exact weightings, see the small print at the bottom of each Top 20 chart.)

The range for the overall rating generally runs from about 60 to 100. A system must score well—typically 80 or above—to make it onto the chart. Those scoring over 90 are the cream of the crop. You can't compare ratings across charts (power desktop to power notebook, for instance); each chart's PCs are compared to a different group of machines. (All the budget notebooks, for instance, are rated against an average derived from the budget portables currently in our database.) But you can use ratings to compare systems within a chart.

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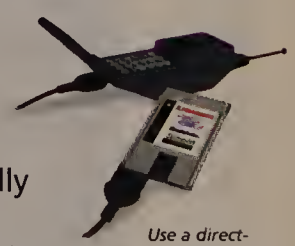

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THE TOP 20

PC WORLD

POWER DESKTOPS

1 **Dell Dimension XPS P133c**
High speed, low price.

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension XPS P133c	2	7	Mar 96	91	193	75/77	$3029	Pentium-133	16	1080
2 Micron P133 Millennia	4	10	Mar 96	91	182	78/72	$2749	Pentium-133	16	1624
3 Dell Dimension XPS P120c	1	9	Mar 96	91	177	75/77	$2979	Pentium-120	16	1080
4 Micron P166 Millennia	3	2	Apr 96	90	200	78/72	$2999	Pentium-166	16	1280
5 Dell OptiPlex GXMT 5133	11	2	Apr 96	89	184	75/77	$3355	Pentium-133	16	1624
6 Dell Dimension XPS P100c	–	9	Mar 96	89	174	75/77	$2699	Pentium-100	16	1080
7 Dell Dimension XPS P166c	5	3	Mar 96	92	208	75/77	$4299	Pentium-166	32	1080
8 Micron P120 Millennia	7	12	Mar 96	88	171	78/72	$2649	Pentium-120	16	1275
9 Digital Celebris GL 5166ST	10	3	Mar 96	88	188	80/74 [3]	$4169	Pentium-166	16	1624
10 Micron P166 Millennia Plus	8	4	Mar 96	87	198	78/72	$4646	Pentium-166	16	2150
11 HP Vectra VL Series 4 5/166 MT	–	1	current	87	197	82/71 [3]	$3915	Pentium-166	16	1280
12 Micron P150 Millennia	–	1	current	87	189	78/72	$2898	Pentium-150	16	1280
13 Micron P100 Millennia	9	10	Mar 96	87	168	78/72	$2599	Pentium-100	16	1275
14 NEC PowerMate P133	12	4	Mar 96	87	185	72/74 [3]	$2699	Pentium-133	16	1624
15 Dell OptiPlex GXMT 5166	–	1	current	86	203	75/77	$3549	Pentium-166	32	1624
16 HP Vectra VL Series 4 5/133	6	4	Mar 96	86	181	82/71 [3]	$3615	Pentium-133	16	1080
17 NEC PowerMate P166	–	1	current	83	193	72/74 [3]	$3399	Pentium-166	16	1624
18 Compaq DeskPro XL 5133	13	3	Mar 96	81	173	77/74	$4599	Pentium-133	16	1080
19 Gateway 2000 P5-133	19	3	Mar 96	81	186	68/72	$2854	Pentium-133	16	1624
20 Compaq ProLinea 5100	14	3	Mar 96	81	161	77/74	$3189	Pentium-100	16	1080

BEST BUY

[1] Percent contribution to overall rating: PC WorldBench score (25); reliability (25); features (20); price (15); service and support (15).
[2] Call 800/434-4495 (for payment by Visa or MasterCard) to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95, available April 30). Touch-tone phone required.

2 **Micron P133 Millennia**
Solid all-around Best Buy.

3 **Dell Dimension XPS P120c**
Fast P-120 value.

4 **Micron P166 Millennia**
An affordable P-166.

5 **Dell OptiPlex GXMT 5133**
Comes with ethernet.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number[3]	Reader service no.	Comments (Recommended as home system)
6X	ISA, PCI	17"/.28	800/613-3355	3299	719	A great value—ultrafast and loaded with extras. Dell just upgraded its CD-ROM drive to 6X.
6X	ISA, PCI	15"/.28	800/223-6571	3268	720	Quality system from a reputable vendor; great features and design but a 15-inch monitor.
6X	ISA, PCI	17"/.28	800/613-3355	3281	721	Fast, fully configured PC is perfect for most applications—including multimedia.
6X	ISA, PCI	15"/.28	800/223-6571	3336	722	With a $149 price drop, this is the best deal we've seen on a fast P-166.
4X	ISA, PCI	17"/.28	800/613-3355	3339	723	Price dropped $448 this month. Network administrators should note built-in connectivity.
6X	ISA, PCI	17"/.26	800/613-3355	3347	724	Adjusted price returns former no. 1 budget PC to Power chart; now has 6X CD-ROM drive.
6X	ISA, PCI	17"/.28	800/613-3355	3337	725	We've adjusted the price—it's now more expensive, but still the fastest desktop we've seen.
4X	ISA, PCI	15"/.28	800/223-6571	3242	726	Well configured despite 15-inch monitor, it's the alternative to higher-ranked Dell P-120.
4X	ISA, PCI	15"/.28	800/722-9332	3338	727	Even after $359 price drop, it's expensive; a bit slow for its CPU but networkable out of the box.
6X	ISA, PCI	15"/.28	800/223-6571	3331	728	Fast SCSI P-166's large hard drive and 1GB Iomega Jaz drive make it a pack rat's dream.
4X	ISA, PCI	15"/.28	800/752-0900	3362	729	Well-built, able performer might have ranked higher, but support is weekdays only.
6X	ISA, PCI	15"/.26	800/223-6571	3363	730	One of the fastest P-150s we've tested; it comes with Microsoft Office Professional.
4X	ISA, PCI	15"/.28	800/223-6571	3267	731	Decent speed and a good price; large 1275MB hard drive but just a 15-inch monitor.
6X	ISA, PCI	15"/.28	800/632-4636	3330	732	$300 drop means a great price for speedy PC with fast CD-ROM drive and big hard drive.
4X	ISA, PCI	17"/.28	800/613-3355	3364	733	One of the pricier PCs on the chart, but very fast and comes with 32MB of RAM and ethernet.
4X	ISA, PCI	17"/.28	800/752-0900	3329	734	Steady performer drops with an adjusted, higher price. Support is weekdays only.
6X	ISA, PCI	15"/.28	800/632-4636	3365	735	Good components and solid reliability and service, but not very fast for a P-166.
4X	EISA, PCI	15"/.28	800/345-1518	3340	736	Solid machine, but you pay extra for built-in SCSI, networking features, and EISA slots.
6X	ISA, PCI	17"/.26	800/846-2000	3346	737	Very fast P-133 has a 6X CD-ROM drive; Gateway reliability is lowest on Power chart.
—	ISA, PCI	17"/.28	800/345-1518	3341	738	You pay a lot considering it's one of the few high-end PCs without a CD-ROM drive.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 908.

Top 20 Power Desktops

THREE NEW PENTIUM-166 SYSTEMS EARNED spots on our Power Desktops chart this month, bringing the total number of P-166s on the list to seven. Hewlett-Packard's Vectra VL Series 4 5/166 MT, debuting in 11th place, is not quite as fast as the Dell Dimension XPS P166c (whose PC WorldBench score of 208 is the fastest we've seen), and its configuration isn't as sophisticated. But it's a nice machine that would have placed higher if HP's service rating hadn't dropped. Dell's OptiPlex GXMT 5166, debuting in 15th place, is the P-166 version of Dell's corporate line. It's expensive, but its built-in ethernet makes it a good value for networked offices. NEC's PowerMate P166, in 17th place, is the second-slowest P-166 on the list, but the least expensive after Micron's P166 Millennia.

Dell Dimension XPS P133c

LAST REVIEWED: March 1996

PROS: 512K of secondary cache, 28.8-kbps fax-modem, great service and reliability

CONS: On/off button too close to the floppy eject

The Dell Dimension XPS P133c has hit a sweet spot for power systems: While it can't entirely match the performance sizzle of the Dell Dimension XPS P166c that's lower on the chart, its PC WorldBench score of 193 is still among the fastest we've seen from a P-133. It also costs a cool $1270 less than its sibling; $3029 is very attractive for a PC with 16MB of EDO RAM, a 1080MB hard drive, a 17-inch monitor, and sound and speakers. Dell also now ships all Dimension models with 6X CD-ROM drives. It's backed by round-the-clock tech support and priced with a three-year warranty. And Dell's reliability and service ranks among the best.

Micron P133 Millennia

LAST REVIEWED: March 1996

PROS: Well built, 1624MB hard drive, full multimedia, strong warranty

CONS: Some similarly priced systems have larger monitors

Micron dropped the price on the P133 Millennia by $99 this month, and at $2749 it's now the least expensive Power Desktop Best Buy. For $280 less than the Dell Dimension XPS P133c, you get a bigger hard drive (1624MB), and the same 16MB of EDO RAM, 256K of secondary cache, and 6X CD-ROM drive. One major trade-off is the monitor: The lower price buys you a 15-incher of so-so quality, whereas Dell includes a better 17-inch display. The Dell P-133 also noticeably outperforms the Micron in our Windows 95–based test suite. Micron's excellent on-screen help includes photos and videos of basic hardware maintenance. The improved warranty now covers the CPU and main memory for five years and the rest of the system for three years. Our latest reader survey gives a ringing endorsement to Micron's reliability.

Dell Dimension XPS P120c

LAST REVIEWED: March 1996

PROS: 512K of secondary cache, 28.8-kbps fax-modem, great reliability and service

CONS: On/off button is poorly positioned

At $2979—$100 more than last month—this roomy multimedia minitower now includes a 6X CD-ROM drive, and it's still a solid Best Buy. But while this system has plenty to offer, the Power chart has shifted in favor of the faster machines ranked above it. Not that the P120c is slow—with a PC WorldBench score of 177, it's the fastest P-120 we've ever tested. It comes with 16MB of EDO RAM, a 1080MB hard drive, a 17-inch Dell monitor, and a Number Nine 9FX Motion 771 video board with 2MB of fast dual-ported VRAM. Dell also includes Microsoft Office Professional 95 and answers Windows 95 questions free for 30 days. Dell's highly rated reliability and service come with it, too.

Micron P166 Millennia

LAST REVIEWED: April 1996

PROS: Ultrafast, good price, roomy hard drive, 6X CD-ROM drive

CONS: 15-inch monitor on test unit had noticeable flicker

The price on this P-166 powerhouse has dropped $149 to $2999—a whopping $1647 less than the Micron P166 Millennia Plus in tenth place. It lacks the latter's SCSI storage options, but its 1280MB EIDE hard drive is certainly adequate for most business use, and it includes a 6X CD-ROM drive. With 16MB of EDO RAM and 256K of secondary cache, it's also one of the fastest systems you can buy. Micron's new warranty covers the CPU and main memory for five years and the rest of the system for three years, but labor is covered for the first year only. Micron has received high marks for reliability on our fax-back survey.

Dell OptiPlex GXMT 5133

LAST REVIEWED: April 1996

PROS: LAN ready, multimedia, 17-inch monitor, full three-year warranty on parts and labor

CONS: Pricey for a Pentium-133

A $448 drop in price catapults the Dell OptiPlex GXMT 5133 to Best Buy status. The $3355 price is still high for a Pentium-133, but this minitower comes network-ready with built-in ethernet, and it's even a good stand-alone PC with 16MB of EDO RAM, 256K of pipeline-burst secondary cache, a roomy 1624MB hard drive, a quad-speed CD-ROM drive, and a good-looking 17-inch Dell monitor. The 2MB DRAM graphics and the 16-bit sound controllers are integrated onto the motherboard. The system scored 184 in our PC WorldBench suite—below the number one Dimension XPS P133c, but ahead of most other Pentium-133s we've tested.

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6 Dell Dimension XPS P100c

LAST REVIEWED: March 1996

PROS: Good P-100 performance, 17-inch monitor, 6X CD-ROM drive, strong service and reliability

CONS: On/off button looks like floppy eject, no sound

7 Dell Dimension XPS P166c

LAST REVIEWED: March 1996

PROS: Fastest PC we've tested, 6X CD-ROM drive, 32MB of EDO RAM

CONS: On/off button looks too much like a floppy eject

8 Micron P120 Millennia

LAST REVIEWED: March 1996

PROS: Good performance, big 1275MB hard drive, multimedia, Microsoft Office

CONS: Some similarly priced systems have larger monitors

9 Digital Celebris GL 5166ST

LAST REVIEWED: March 1996

PROS: Integrated sound and video, built-in networking, big 1624MB hard drive

CONS: Expensive; slow for a Pentium-166

10 Micron P166 Millennia Plus

LAST REVIEWED: March 1996

PROS: 2GB SCSI hard drive, 1GB removable storage drive, 6X CD-ROM drive

CONS: Some similarly priced systems have larger monitors

11 HP Vectra VL Series 4 5/166 MT

NEW THIS MONTH

PROS: Solid performance, well constructed

CONS: Tech support is open 11 hours on weekdays only

A shoo-in entry to our Power chart, the HP Vectra VL Series 4 5/166 MT Pentium-166 minitower has a highly competitive $3915 price. Equipped with 16MB of RAM and 256K of secondary cache, it turned in a PC WorldBench score of 197—a midrange mark compared to other Pentium-166s we've tested. The system also comes with a quad-speed Sony CD-ROM drive and a Creative Labs Vibra 16S sound card, but for the full multimedia experience you'll have to buy your own speakers—this system doesn't come with any. This HP Vectra also falls a shade short of the ideal power contender: It lacks a modem, and it comes with just a 15-inch monitor when 17-inch models are becoming more common with power machines. However, this is a fine-looking display that performs well with the upscale Matrox Millennium graphics card and 2MB of WRAM.

HP Vectra

Looking at this Vectra's sturdy construction and superior design, it's easy to understand why Hewlett-Packard systems top our reliability charts. The case is sturdy and cleanly finished, and you can tell that HP designed the impeccably arranged motherboard from the ground up. It provides unobstructed access to the SIMM slots, cache modules, and expansion slots (systems assembled from a collection of components often look cluttered inside). A vertical riser houses the expansion slots, and there are plenty to choose from: Two PCI and three ISA slots are free.

The printed documentation is also up to HP's usual high standards—sensibly organized, with clear explanations and helpful illustrations. You'll find that the online help is well designed and intuitively structured to boot. HP's telephone support, although limited to 11 hours on weekdays only, is top-notch: There's little or no wait, and you talk to capable technicians. Technical support is free for the duration of HP's three-year warranty on parts and labor.

12 Micron P150 Millennia

NEW THIS MONTH

PROS: Fast performance, bundles Microsoft Office Professional

CONS: Motherboard components block some slots

Pentium-150 CPUs are the underappreciated middle children of the Intel family: They aren't much faster than their less-expensive Pentium-133 siblings, which makes a Pentium-166 PC a more logical buy. An exception is Micron's $2898 P150 Millennia minitower, which ties Midwest Micro's P5-150 Office PC as the fastest Pentium-150 system we've tested—faster than some P-166 machines.

Micron P150

The P150 Millennia's solid configuration includes 16MB of RAM, a Diamond Stealth graphics card with 2MB of VRAM, a 1.2GB hard drive, a sound card, a 6X CD-ROM drive, and a 15-inch MAG monitor. As a nice software bonus, you also get the Microsoft Office Professional suite on CD-ROM. All in all, this system presents an intriguing alternative to the P133 Millennia that's number two on the Power Desktops chart; the Pentium-133 model is $149 cheaper and has a larger hard disk, but it's slower.

We have a few complaints about the P150 Millennia, but they're small ones: The on-screen help could be more comprehensive. Motherboard components block all three of the ISA expansion slots from accepting very long cards, and the Micron system's printed manual, though informative, lacks an index. To its credit, the company does provide adequate manuals for components such as the CD-ROM drive and monitor.

PC World readers responding to our fax-back survey on reliability and service give Micron high marks on all counts, and the company's support policies are nearly impeccable. Micron's round-the-clock phone support assures that help is at hand whenever you need it. The CPU and RAM that come with the system are covered for five years, and all other parts are covered for three years. Labor costs for repairs are free for the first year only, however. A number of other companies pick up labor costs for a full three years, among them Compaq and Dell (for its Dimension systems).

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13 Micron P100 Millennia

LAST REVIEWED: March 1996

PROS: Good P-100 performance, includes Microsoft Office Professional 95

CONS: Some similarly priced systems have larger monitors

14 NEC PowerMate P133

LAST REVIEWED: March 1996

PROS: Good performance, 6X SCSI CD-ROM drive, big 1624MB hard drive

CONS: Some cable clutter inside case

15 Dell OptiPlex GXMT 5166

NEW THIS MONTH

PROS: Fast performance, uncluttered interior, ethernet port, nice documentation

CONS: Expensive

Dell designs its OptiPlex systems to appeal to corporate customers rather than price-conscious individual consumers, and it shows: This $3549 Pentium-166 minitower is a system technician's delight. Expanding or repairing it should prove uncommonly simple, since all ports and interfaces, including an ethernet connector, are integrated onto the motherboard. This leaves the system's eight expansion slots free, and the interior is as neatly organized as Martha Stewart's kitchen. The outstandingly thorough documentation includes a thick troubleshooting guide.

Although this system trails Dell's blazing Dimension XPS P166c in speed, it's still the second-fastest on our Power Desktops chart. Both of these high-powered Dell configurations come with 32MB of RAM rather than the more typical 16MB. The OptiPlex also comes with a roomy 1.6GB hard drive, an S3-based graphics adapter with 2MB of VRAM, a quad-speed CD-ROM drive, a Creative Labs sound card, and a 17-inch monitor.

Dell OptiPlex 5166

As usual with Dell, the system is backed by a top-notch service and support plan. Although a one-year warranty is still the standard for Dell, we priced the system to include an upgrade to a full three-year warranty and one year of free on-site service. You also enjoy round-the-clock phone support for the life of the system. The company consistently receives favorable mentions from *PC World* readers responding to our fax-back survey, especially with regard to the quality of its service.

You can find similar Pentium-166 configurations that cost less than the OptiPlex GXMT 5166, but this system's high level of refinement, fast performance, and built-in ethernet make it a strong candidate if you need a high-end network PC.

16 HP Vectra VL Series 4 5/133

LAST REVIEWED: March 1996

PROS: 3-D video acceleration, superb system reliability

CONS: Limited expandability, adjusted $3615 price is higher

17 NEC PowerMate P166

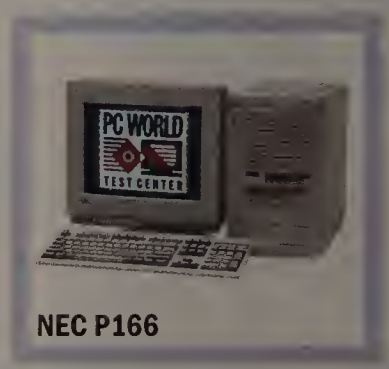
NEW THIS MONTH

PROS: Generous support, high-quality monitor and multimedia components, large hard drive

CONS: Mediocre performance, cramped interior

A power contender doesn't make the chart by performance alone. NEC's sleekly designed PowerMate P166 minitower is one of the slowest Pentium-166 systems we've tested, but a host of high-quality components backed by a solid reliability and service record earn it a place on the Top 20.

Considering its economical $3399 price, this Pentium-166 is well equipped: It comes with 16MB of RAM, a generous 1624MB hard disk, a Matrox Millennium video card with 2MB of speedy Windows RAM, a 6X CD-ROM drive, a 16-bit sound card, and a pair of NEC speakers that provide better-than-average sound. You also get a high-quality microphone, something few multimedia PCs provide. The monitor is NEC's 15-inch MultiSync XV15+, an improved version of the MultiSync XV15 that was a Best Buy on our Top 10 Monitors chart last month. The XV15+ adds digital controls and Level 2 Plug and Play compatibility.



NEC P166

The PowerMate's interior is a little crowded, however, with a morass of cables that prevents easy access to the SIMM sockets. The five available expansion slots are located on a vertical riser that plugs into the motherboard. The height of the CPU prevents you from inserting a long card in one of the slots.

NEC's first-rate service-and-support policies add to this system's allure: The company offers a three-year warranty on parts and labor, free on-site service for the first year of ownership, and phone support that's available 24 hours a day, seven days a week. NEC also garners compliments from our readers responding to our service and reliability survey. Even though the PowerMate P166 lags somewhat in performance, its otherwise strong configuration and generous service and support make it a good value.

18 Compaq DeskPro XL 5133

LAST REVIEWED: March 1996

PROS: SCSI hard drive, integrated ethernet adapter, full multimedia, great reliability and service

CONS: Second-most expensive PC on the chart

19 Gateway 2000 P5-133

LAST REVIEWED: March 1996

PROS: Attractive price, good performance, roomy 1624MB hard drive

CONS: Lowest reliability score on Power chart

20 Compaq ProLinea 5100

LAST REVIEWED: March 1996

PROS: Well built, large high-quality monitor, outstanding reliability and service

CONS: Sluggish and expensive for a P-100, no CD-ROM drive

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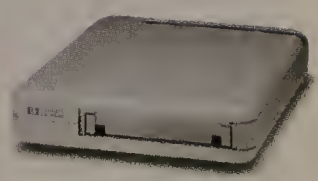

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THE TOP 20

PC WORLD

BUDGET DESKTOPS

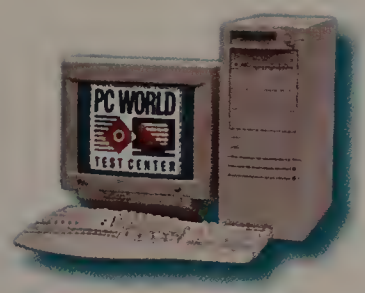
1 **Dell Dimension P75t**
Great entry-level PC.

	Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)
1 Dell Dimension P75t	2	6	Mar 96	96	100	75/77	$2079	Pentium-75	8	540
2 Vektron Multimedia P-100	3	5	Mar 96	96	171	[3]	$1695	Pentium-100	16	1080
3 DTK Quin 54M/P100	9	3	Mar 96	94	148	73 [3]/66 [3]	$2090	Pentium-100	16	1080
4 Gateway 2000 P5-75	7	6	Mar 96	94	98	68/72	$1609	Pentium-75	8	850
5 ZDS Z-Station VP	6	2	Apr 96	93	91	77 [3]/ [3]	$1860	Pentium-75	8	850
6 Dell OptiPlex GL+575	12	3	Mar 96	93	121	75/77	$2111	Pentium-75	16	540
7 Gateway 2000 P5-120	17	5	Mar 96	92	176	68/72	$2299	Pentium-120	16	1083
8 Diamond DT-100	13	3	Mar 96	92	156	[3]	$1645	Pentium-100	16	1080
9 Quantex QP5/100 M-3	11	2	Mar 96	92	167	61/63	$1899	Pentium-100	16	1280
10 Compaq ProLinea 575e	–	1	current	91	86	77/74	$1754	Pentium-75	8	630
11 Netis N500 Media	–	1	current	91	166	[3]	$2048	Pentium-100	16	1625
12 CompuTrend Premio 5x86-100	8	4	Mar 96	90	126	[3]	$1699	Cx5x86-100	16	1080
13 Netis N5133DPS	–	1	current	90	185	[3]	$2120	Pentium-133	16	1624
14 Netis N5120 Media	–	1	Apr 96	90	170	[3]	$2049	Pentium-120	16	1624
15 Tempest Pentium Giga Media P5-100	14	5	Mar 96	89	132	[3]	$1988	Pentium-100	16	1270
16 Digital Venturis 575	16	6	Mar 96	89	100	80/74 [3]	$2227	Pentium-75	8	850
17 Netis N4100	18	3	Mar 96	89	83	[3]	$1415	DX4-100	8	1220
18 Austin PowerPlus 75	5	3	Mar 96	89	127	67 [3]/ [3]	$2169	Pentium-75	16	850
19 Micro Express MicroFlex-PCI/5133	20	2	Apr 96	88	190	59 [3]/ [3]	$2299	Pentium-133	16	1280
20 Swan Pentium 75 Series	19	4	Mar 96	88	87	66 [3]/ [3]	$1798	Pentium-75	8	850

BEST BUY

[1] Percent contribution to overall rating: price (25); reliability (25); features (20); PC WorldBench score (15); service and support (15).
[2] Call 800/434-4495 (for payment by Visa or MasterCard) to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95). In addition, you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95, available April 30). Touch-tone phone required.

2 **Vektron Multimedia P-100**
Fast system on the cheap.



3 **DTK Quin 54M/P100**
Note $260 drop, 6X CD-ROM drive.

4 **Gateway 2000 P5-75**
Basic features, low price.

5 **ZDS Z-Station VP**
Good price, poky speed.

CD-ROM drive	Bus slots	Monitor size/ dot pitch	Vendor contact number	Fax reprint number [2]	Reader service no.	Comments (Recommended as home system)
6X	ISA, PCI	17"/.26	800/613-3355	3313	739	Not very fast but well built; it now comes with 6X CD-ROM drive.
4X	ISA, PCI	15"/.28	800/725-0026	3325	740	Upgraded to 1080MB hard drive, but Vektron's reliability and service is undetermined.
6X	ISA, PCI	15"/.28	800/289-2385	3351	741	Well decked out, affordable PC with fast CD-ROM drive; price dropped $260.
6X	ISA, PCI	15"/.25	800/846-2000	3317	742	Underwhelming features and speed, but one of the lowest-cost, best-built systems on the chart.
4X	ISA, PCI	15"/.28	800/582-0524	3350	743	Roomy, well-built PC's price is competitive with those of other P-75s; it's slow, though.
4X	ISA, PCI	15"/.25	800/613-3355	3354	744	A $127 price drop boosts low-powered, networkable PC's ranking.
6X	ISA, PCI	15"/.25	800/846-2000	3309	745	Reasonably fast P-120 gets a $200 price drop—and a boost in the ratings.
6X	ISA, PCI	14"/.28	800/989-7253	3555	746	Now costs $140 less, but the monitor is small and the documentation sparse.
4X	ISA, PCI	15"/.28	800/896-4898	3353	747	Fast multimedia PC drops another $50 and rises two places in the ranks.
—	ISA, PCI	15"/.28	800/345-1518	3366	748	Slowest P-75 on the chart, and it's not loaded—but it's inexpensive and well built.
4X	ISA, PCI	15"/.28	800/577-7526	3367	749	Fast for a P-100, but documentation consists of technical manuals only—not for novices.
4X	ISA, PCI	15"/.28	800/677-6477	3323	750	Think of this as Pentium-75 performance for a 486 price; fully loaded but no weekend support.
4X	ISA, PCI	15"/.28	800/577-7526	3368	751	Price drop brings this loaded system onto the chart. Netis's reliability is undetermined.
4X	ISA, PCI	15"/.28	800/577-7526	3369	752	A $241 price drop makes this a good value if you don't mind minimal documentation.
4X	ISA, PCI	15"/.28	800/818-5163	3356	753	Incredible price for a multimedia PC with generous RAM and storage space.
4X	ISA, PCI	14"/.28	800/722-9332	3358	754	A little pricey for a P-75; makes the chart on the strength of Digital's reliability.
4X	ISA, PCI	15"/.28	800/577-7526	3359	755	Nice features and a low price, but the manuals don't cater to end users.
4X	ISA, PCI	15"/.28	800/752-1577	3349	756	Still fast and feature rich, but Austin's price adjustment makes it more expensive.
4X	ISA, PCI	15"/.28	800/989-9900	3361	757	Fastest system on chart has full multimedia and a modem; a good price for what you get.
4X	ISA, PCI	15"/.28	800/261-7926	3360	758	A PC you can talk to (with its voice modem), but one of the slowest P-75s on the chart.

[3] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 909.

Top 20 Budget Desktops

THE BUDGET CHART IS RAPIDLY GAINING POWER. Just one DX4-100 system remains this month, and the chart now includes two Pentium-133s, two Pentium-120s, and six Pentium-100s. The two most expensive of these powerful PCs cost just $2299 with 16MB of RAM and 1GB or larger hard drives.

Two new systems, the Compaq ProLinea 575e and the Netis N500 Media, take positions in the middle of the chart this month. But it's the price changes—both up and down—that are chiefly responsible for shuffling the rankings. Several Pentium-based Netis machines that we tested in previous months make their first appearance on the chart because of price drops. We had to move the Austin PowerPlus 75 down 13 steps after correcting its price. The PowerPlus is by far the fastest Pentium-75 on the chart (27 percent faster than the baseline P75t Dell), but at $2169 it's the second-most expensive.

1 Dell Dimension P75t

LAST REVIEWED: March 1996

PROS: Low price, nice 17-inch monitor, great service and support

CONS: On/off button looks like floppy eject, small hard drive

A Pentium-75 for $2079 looks expensive until you see the 17-inch monitor and the 6X CD-ROM drive. (Dell has upgraded all Dimensions to 6X CD-ROM drives; the systems cost $100 more than they would with 4X drives.) The 540MB hard drive is meager; we suggest spending $80 more for the 1080MB drive. Our reliability and service polls consistently rank Dell among the best, as you'd expect with Dell's good tech support.

2 Vektron Multimedia P-100

LAST REVIEWED: March 1996

PROS: Fast Pentium-100 performance, great price, full multimedia

CONS: No weekend technical support

At $1695, the Vektron Multimedia P-100 is one of the lowest-priced P-100s around, yet it's packed with a 1080MB hard drive, a quad-speed CD-ROM drive, and a 15-inch monitor, and it's the fastest Pentium-100 on the Budget Desktops chart. This unit would be number one if not for the minimal one-year warranty and Vektron's complete lack of weekend support.

3 DTK Quin 54M/P100

LAST REVIEWED: March 1996

PROS: Solid P-100 performance, 6X CD-ROM drive

CONS: Some cable clutter

This Pentium-100's price is now a very reasonable $2090. This, along with above-average features, snares it a Best Buy. The full-size tower has ample room for additional drives and expansion cards. The system comes with a two-year parts-and-labor warranty.

4 Gateway 2000 P5-75

LAST REVIEWED: March 1996

PROS: Excellent price, good performance, three-year warranty

CONS: No sound or secondary cache

For just $1609, this P-75 includes a 6X CD-ROM drive. However, you get just a basic 8MB of RAM, no secondary cache even as an option, and no sound. Gateway's system reliability rating has improved in recent months, and the company has been getting good marks for service in our fax-back poll.

5 ZDS Z-Station VP

LAST REVIEWED: April 1996

PROS: Well built, lots of room for expansion, three-year warranty

CONS: Sluggish performance for a P-75, no sound

Increased prices bumped two of last month's Best Buys off the chart. That turn of events elevated the $1860 ZDS Z-Station VP—a strong number six in April. Like most ZDS PCs we test, this one is well designed, but its performance lagged behind most other PCs in its processor class. ZDS's system reliability rating is superior.

6 Dell OptiPlex GL+575

LAST REVIEWED: March 1996

PROS: Well built, network ready, 16MB of RAM, quad-speed CD-ROM drive

CONS: Small 540MB hard drive, limited expandability, no sound

7 Gateway 2000 P5-120

LAST REVIEWED: March 1996

PROS: Very fast, 16MB of RAM, 1083MB hard drive, 6X CD-ROM drive

CONS: Expensive compared to other top budget PCs

8 Diamond DT-100

LAST REVIEWED: March 1996

PROS: Fully loaded, low price, solid performance, 6X CD-ROM drive

CONS: Small 14-inch monitor, poor documentation, one-year warranty

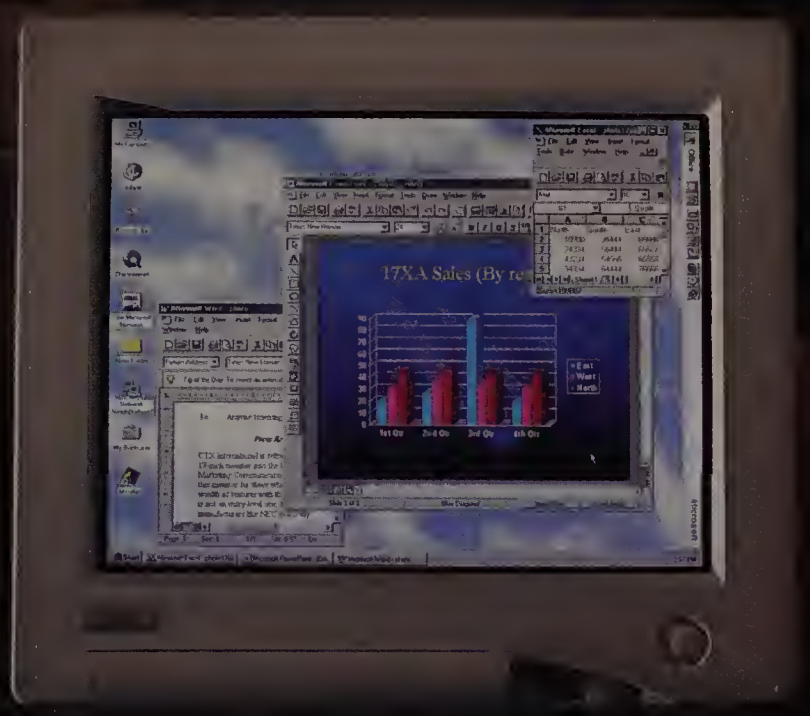
9 Quantex QP5/100 M-3

LAST REVIEWED: March 1996

PROS: Fast, great $1899 price, 1280MB hard drive, full multimedia, 14.4-kbps fax-modem

CONS: Mediocre marks for reliability and service

How CTX Keeps The Big Names All Boxed In.



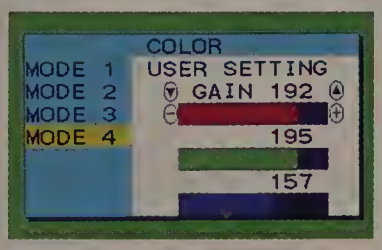
We're out-selling our big competitors and getting rave media reviews simply by providing more for less.

Take this handsome new DiamondTron™ 17XA (16" viewable) color monitor.

You'll be amazed at its picture quality. Compare its precision and clarity, center-to-corner and edge-to-edge, with any other monitor.

Look carefully at the sharpness and brightness that its 0.25 aperture-grill pitch delivers at resolutions all the way up to 1600 x 1200 (NI).

Yet notice how its anti-glare, anti-reflection coating makes such vivid color so easy on your eyes.



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Don't put off upgrading your monitor another day.

We make your decision easy. With more features. Quick Plug and Play* installation. ISO-9000-quality manufacturing. A three-year limited warranty. Energy SuperStar™ power savings. PC, Mac, Sun and SPARC compatibility. Plus low TCO emissions.

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Best Buy — *1765GMe Monitor June 1995*

PC MAGAZINE EDITORS' CHOICE — *1765GMe Monitor September 1995*

PC WORLD BEST BUY — *1785GM Monitor March 1995*

MacUser RATED — *1785GM Monitor May 1995*

TCO 1992 — REDUCED ELECTROMAGNETIC FIELDS — AUTOMATIC DISPLAY POWER DOWN

Energy — EPA POLLUTION PREVENTER

ISO 9000

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10 Compaq ProLinea 575e

NEW THIS MONTH

PROS: Low price, tidy interior, high-quality support

CONS: Poor performance, no multimedia, only one free drive bay

The ProLinea 575e—a solidly built, if very basic system—has appeared on the Budget Desktops chart before. This updated configuration costs a low $1754 and comes with a larger hard drive—630MB—but no secondary cache, so it lags behind most other Pentium-75 PCs with 8MB of RAM. It also lacks multimedia.

Compaq ProLinea 575e

The system's strongest point is its clean design; all ports, adapters, and RAM are integrated onto the motherboard. That's great for adding internal components, but other peripherals will have to compete for the one free external drive bay.

You get a three-year warranty, free on-site service, and 24-hour phone help. These policies rank with the best in the business, as do Compaq 's service and reliability ratings.

11 Netis N500 Media

NEW THIS MONTH

PROS: Quick performance, large hard disk

CONS: No system manual, one-year parts warranty, SIMM sockets tough to access

This $2048 P-100 compact delivers maximum performance for those on a budget. Its PC WorldBench score even beats some P-133s we've tested, and its configuration includes a 1625MB hard disk.

Netis's service and support policies are merely adequate, however. The system documentation is a collection of booklets that don't cater to end users. The warranty covers labor for three years but parts for just one. We haven't seen enough surveys from Netis customers to reach any firm conclusions about the quality of its service or the reliability of its PCs.

Netis N500 Media

12 CompuTrend Premio 5x86-100

LAST REVIEWED: March 1996

PROS: Great $1699 price for loaded PC with multimedia, performs like a fast P-75

CONS: No weekend technical support

13 Netis N5133DPS

NEW THIS MONTH

PROS: Fast; great price; big hard drive

CONS: One-year parts warranty

The N5133DPS didn't make the chart when we first looked at it in March, but with a price drop to $2120, it's a more attractive value. Well equipped, and with a PC WorldBench score of 185, it performs as well as pricier P-133s we've tested.

Netis N5133DPS

Only Netis's service and support policies lack strength. The warranty covers labor for three years but parts for just one. Technical support is available only 10 hours on weekdays and 6 hours on Saturday. And the check-up calls we've made to tech support have yielded mixed results. Furthermore, we haven't received enough fax-back data from readers on Netis system reliability and service to assess those important factors.

14 Netis 5120 Media

LAST REVIEWED: April 1996

PROS: Low $2049 price for a P-120, 1624MB hard drive, full multimedia, 14.4-kbps fax-modem

CONS: One-year parts warranty

15 Tempest Micro Pentium Giga Media P5-100

LAST REVIEWED: March 1996

PROS: Inexpensive $1988 price, 1270MB hard drive, full multimedia, 14.4-kbps fax-modem

CONS: Relatively slow performance for a Pentium-100

16 Digital Venturis 575

LAST REVIEWED: March 1996

PROS: Well designed and well constructed, excellent score for reliability

CONS: Small 14-inch monitor, limited expandability, no sound

17 Netis N4100

LAST REVIEWED: March 1996

PROS: Super-low $1415 price for DX4-100 with 1220MB hard drive and full multimedia

CONS: Fairly slow, one-year parts warranty

18 Austin PowerPlus 75

LAST REVIEWED: March 1996

PROS: Great P-75 performance, 16MB of RAM, full multimedia, 14.4-kbps fax-modem

CONS: At $2169, costs more than some comparably equipped PCs

19 Micro Express MicroFlex-PCI/5133

LAST REVIEWED: April 1996

PROS: Excellent $2299 price for fast P-133 with 1280MB hard drive, full multimedia

CONS: Early returns indicate a below-average reliability score

20 Swan Pentium 75 Series

LAST REVIEWED: March 1996

PROS: Integrated 14.4-kbps voice fax-modem, full multimedia

CONS: One of the slowest Pentium-75s we've tested

NEW! VERSION 1.1
NOW
INCLUDES
28.8 MODEM SUPPORT*
FULL SCREEN CONFERENCE
AUTO ANSWER FEATURE

*REQUIRES WINDOWS 95
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THE TOP 20

PC WORLD

NOTEBOOK PCs

1 **Toshiba Satellite Pro 400CDT**
Quality multimedia to go.

POWER SYSTEMS

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Multi-media
1	Toshiba Satellite Pro 400CDT	1	5	Mar 96	89	124	85/73 [4]	$3999	Pentium-75	16	810	sound/CD
2	WinBook XP5 P120	2	2	Apr 96	89	146	61/82 [4]	$3799	Pentium-120	16	1295	sound
3	Gateway 2000 Solo S5-90XL	4	2	Apr 96	88	139	72 [4]/70 [4]	$3999	Pentium-90	16	810	sound/CD
4	WinBook XP5 P90	5	2	Apr 96	87	133	61/82 [4]	$3399	Pentium-90	16	814	sound
5	Toshiba Satellite Pro 410CDT	10	2	Apr 96	87	126	85/73 [4]	$5078	Pentium-90	16	814	sound/CD
6	Dell Latitude XPi P90T	7	7	Mar 96	86	118	78 [4]/73 [4]	$3999	Pentium-90	16	810	–
7	WinBook XP5 P75	8	3	Mar 96	86	124	61/82 [4]	$2999	Pentium-75	16	814	sound
8	NEC Versa 4080H	6	2	Apr 96	85	132	77 [4]/ [4]	$4999	Pentium-120	16	1080	sound/CD
9	IBM ThinkPad 760C	–	1	current	85	121	80/72 [4]	$6184	Pentium-90	16	720	sound
10	Austin Business Audio P-90	9	4	Mar 96	84	133	70 [4]/ [4]	$3608	Pentium-90	16	720	sound

BUDGET SYSTEMS

		Last month	Months on chart	Last reviewed	Overall rating [1]	PC WorldBench score	Reliability/ service rating	Price	CPU	RAM (MB)	Hard drive (MB)	Multi-media
1	Dell Latitude LX 4100D	1	7	Mar 96	89	84	78 [4]/73 [4]	$1928	DX4-100	8	420	–
2	Toshiba Satellite T2130CS	3	3	Mar 96	88	65	85/73 [4]	$1599	DX4-75	8	503	–
3	Dell Latitude LX 4100T	2	2	Mar 96	87	109	78 [4]/73 [4]	$2699	DX4-100	16	810	–
4	NEC Versa 2000D	4	4	Mar 96	84	49	77 [4]/ [4]	$1599	DX4-75	8	360	–
5	Hertz Z-Optima 486 D100 X4E	–	1	current	82	98	[4]	$2195	DX4-100	16	810	–
6	NEC Versa 2000C	10	3	Mar 96	81	59	77 [4]/ [4]	$2099	DX4-75	8	540	–
7	AST Ascentia 950N/75	–	1	current	81	83	70 [4]/64 [4]	$2455	Pentium-75	8	810	sound
8	Compaq Contura 420CX	9	2	Apr 96	79	64	71/75 [4]	$2549	DX4-75	8	420	–
9	Compaq Contura 430C	6	3	Mar 96	78	65	71/75 [4]	$2499	DX4-100	8	720	–
10	Texas Instruments Extensa 450	–	1	Apr 96	78	42	66 [4]/ [4]	$1798	DX4-75	8	340	–

BEST BUY

[1] Percent contribution to overall rating for power notebook: PC WorldBench score (22); reliability (22); features and design (16); price (14); service and support (10); battery (8); weight (8). Percent contribution to overall rating for budget notebooks is the same except for price (22) and PC WorldBench score (14). [2] CA=color active, CD=color dual-scan, CP=color passive. [3] Call 800/434-4495 (for payment by Visa or MasterCard) to order fax copies of system reviews. You can order three systems' capsule reviews ($4.95), a single capsule review plus features table and test report ($4.95), an entire month's review ($9.95), and a list of all systems tested by the PC World Test Center ($4.95).

2 **WinBook XP5 P120**
As fast as a notebook gets.

1 **Dell Latitude LX 4100D**
Best bet for the cost conscious.

2 **Toshiba Satellite T2130CS**
High quality, low price.

	Weight (pounds)	Battery life (hours)	Screen type/ size [2]	Vendor contact number	Fax reprint number [3]	Reader service no.	Comments
	9.0	4:21	CA/10.4"	800/457-7777	3728	759	Fast, feature-laden notebook is affordable too; perfect as a primary computer.
	7.4	6:19	CA/10.3"	800/468-2162	3738	760	Fastest performance, longest battery life, great configuration, but very low reliability rating.
	7.2	5:19	CA/10.4"	800/846-2000	3739	761	$400 price drop nudges fast multimedia notebook up a notch; excellent battery life.
	7.4	5:42	CA/10.3"	800/468-2162	3740	762	Fast, loaded, reasonably priced, but we'd like the $399 CD-ROM docking station included.
	9.0	5:03	CA/10.4"	800/457-7777	3743	763	$300 price drop boosts feature-rich system; it's not very fast, but tops in reliability.
	7.2	3:33	CA/10.3"	800/613-3355	3712	764	Still a bit pricey, but it's fast, lightweight, and has a good-looking screen.
	7.2	5:01	CA/10.3"	800/468-2162	3742	765	One of the fastest, longest-lasting, most decked out notebooks you can get for under $3000.
	8.2	3:35	CA/10.4"	800/632-4636	3741	766	Pricey, with short battery life, but a good desktop replacement; easy to use and customize.
	8.2	5:09	CA/12.1"	800/772-2227	3747	—	Expensive system with long battery life performs well, has big display, comfortable keyboard.
	8.2	3:35	CA/10.3"	800/321-1501	3733	767	Reasonable price for fast, feature-rich notebook with acceptable battery life.
	7.2	5:11	CD/10.4"	800/613-3355	3716	768	Quality notebook if you want something inexpensive, fast, well built, with long battery life.
	7.2	3:01	CD/10.4"	800/457-7777	3744	769	Sluggish, short battery life, but reliable and inexpensive—good basic computing for the road.
	7.2	4:26	CA/10.4"	800/613-3355	3736	770	Superb choice if you're on a tight budget; it's fast, with ample storage and a bright screen.
	7.2	5:09	CD/10.4"	800/632-4636	3734	771	Very slow but also cheap, with long battery life, good screen; built to last.
	8.2	2:35	CA/9.5"	800/232-8737	3748	772	Price is tempting if you don't mind short battery life and the lack of reliability rating for Hertz.
	7.8	3:16	CA/9.5"	800/632-4636	3722	773	Pretty fast DX4-75 dropped $500 in price. Nice, if small, active-matrix screen.
	7.2	5:11	CA/10.3"	800/876-4278	3729	774	Very slow for a P-75, but has long battery life; reliability score is middling.
	7.4	5:21	CA/10.4"	800/345-1518	3746	775	Expensive for what you get, but it performs well and is built by an industry leader.
	7.4	4:46	CD/10.4"	800/345-1518	3745	776	Good price for well-made notebook backed by high-rated reliability.
	6.4	4:42	CD/10.4"	800/848-3927	3749	777	$200 price drop puts this PC on the chart; not fast or loaded, but battery life is good.

In addition you can order next month's Top 20 charts and capsule reviews in advance (The Top 20 Flash Report, $9.95, available April 30). Touch-tone phone required. [4] We received fewer than 100 Reliability and Service Monitor responses for this company. Its ratings are based on a combination of responses for it and the average for all companies for which we received 20 to 99 responses. If we received fewer than 20 reliability or service responses for a company, no score appears.

For more information about all products in this table, circle reader service no. 910.

Top 20 Notebook PCs

THIS MONTH WE REVIEW THE EXTREMES OF what's available to notebook buyers. The ThinkPad 760C is a high-quality notebook from IBM. It's got the largest screen size available (12.1 inches diagonally), fine audio, and a keyboard that peaks in the middle for greater comfort. While its $6184 price lies beyond the reach of average business users, it still has enough value to rank on our Power chart. At the other end of the scale, the Hertz Z-Optima 486 D100 X4E on the Budget chart boasts a very low price in exchange for cutting the frills—though to its credit, 16MB of RAM is unusual for a budget notebook. Hertz's track record for reliability and service is largely unknown to us, however.

The Toshiba Satellite Pro 400CDT and the WinBook XP5 P120 remain our Power Best Buys, and the Dell Latitude LX 4100D keeps the top Budget spot. Our new number two budget notebook is the Toshiba Satellite T2130CS. A slight rise in Toshiba's service rating nudges it above Dell's Latitude LX 4100T, a higher-end version of the 4100D and former number two Best Buy.

Power Notebooks

Toshiba Satellite Pro 400CDT

LAST REVIEWED: March 1996

PROS: Fast, good battery life, top-notch reliability, quad-speed CD-ROM drive

CONS: Its 9-pound carrying weight is on the heavy side

The $3999 Toshiba Satellite Pro 400CDT is not cheap for a Pentium-75 notebook, but considering that the price includes 16MB of RAM, an 810MB hard drive, a quad-speed CD-ROM drive, and built-in sound and speakers—not to mention Toshiba's stellar reputation for reliability and service—it's well worth the investment.

As with all Toshiba notebooks we've seen, the quality of design and construction is excellent: The case feels solid, the keyboard and the embedded minijoystick pointing device are comfortable to use, and the bright 10.4-inch active-matrix screen supports 16.8 million colors. Battery life is good, but not outstanding, at 4.3 hours.

Toshiba's documentation for the Satellite Pro 400CDT is clearly written and well organized. Perhaps best of all, readers consistently give Toshiba reliability high marks on our fax-back surveys, and the Satellite Pro is backed by a superb three-year warranty.

Our main complaint with this system concerns its carrying weight: With the battery installed, and including the AC adapter, the floppy drive, and the CD-ROM drive, the Satellite Pro weighs in at a shoulder-straining 9 pounds.

WinBook XP5 P120

LAST REVIEWED: April 1996

PROS: Ultrafast; huge hard drive, long battery life, 14.4-kbps fax-modem

CONS: One-year warranty, low reliability ratings

It's hard to argue with success, and when it comes to notebooks, WinBook has made its mark. This 7.4-pound Pentium-120 is the fastest notebook on our chart, and its $3799 price is right on for a system loaded with 16MB of RAM, a huge 1295MB removable hard drive, a bright 10.3-inch color active-matrix screen, and a 14.4-kbps internal fax-modem. Battery life is impressive, too: The XP5 P120 lasted well over 6 hours in our tests.

The comfortable keyboard has good responsiveness and full key travel, and you have your choice of pointing devices: a minijoystick embedded in the keyboard, a touchpad built into the wrist rest, or an optional trackball you can swap for the touchpad. The system also features a infrared port, an internal microphone, built-in sound, and speakers with external volume control.

Service and support for WinBooks are decent. Toll-free support is available 11 hours every day. The warranty lasts just one year, however (an extension to three years costs $299). In our ongoing fax-back survey, *PC World* readers give WinBook notebooks mediocre ratings for reliability. We haven't received enough reports on the company's service to gauge its quality.

Gateway 2000 Solo S5-90XL

LAST REVIEWED: April 1996

PROS: Fast P-90 with 5.3-hour battery life, 4X CD-ROM drive, Microsoft Office Professional 95

CONS: Mediocre keyboard, insufficient brightness adjustment for different lighting conditions

WinBook XP5 P90

LAST REVIEWED: April 1996

PROS: Well built, fast P-90 performance, 5.7-hour battery life, 14.4-kbps fax-modem

CONS: One-year warranty, low reliability ratings

Toshiba Satellite Pro 410CDT

LAST REVIEWED: April 1996

PROS: A $300 price drop elevates a notebook with excellent reliability scores

CONS: Still quite expensive at $5078

Dell Latitude XPi P90T

LAST REVIEWED: March 1996

PROS: New $99 price drop, big 810MB hard drive, 16.8 million–color screen, strong support

CONS: 3.5-hour battery life shorter than we expect from top notebooks

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7 WinBook XP5 P75

LAST REVIEWED: March 1996

PROS: Fast for a P-75, 5-hour battery life, 814MB hard drive, 14.4-kbps fax-modem

CONS: One-year warranty, low marks for system reliability

8 NEC Versa 4080H

LAST REVIEWED: April 1996

PROS: Good P-120 performance, comfortable keyboard, 1080MB hard drive, quad-speed CD-ROM drive, 800 by 600 screen

CONS: Very expensive at $4999, muted screen colors, fairly short 3.5-hour battery life

9 IBM ThinkPad 760C

NEW THIS MONTH

PROS: Strong performance and battery life, extra-large display, high-quality sound, comfortable keyboard, great software bundle

CONS: Expensive, swapping batteries is complex

As usual with IBM's innovative ThinkPads, just about the only thing wrong with this machine is its price: $6184. Look on the bright side, though: The 8.2-pound 760C costs $1200 less than the top-of-the-line ThinkPad 760CD and is nearly identical, except it lacks a CD-ROM drive and hardware-assisted MPEG video playback and has a smaller hard drive (720MB). But it does have the same gorgeous 12.1-inch active-matrix color screen—as big as you'll find on any notebook—and an ingenious keyboard that slants up from the sides and makes typing more comfortable.

IBM

The system's performance and 5-hour-plus battery life far surpass the average for other Pentium-90 notebooks with 16MB of RAM. The 760C includes a 14.4-kbps fax-modem with answering machine features, and a built-in wavetable sound card that provides some of the best audio we've heard from a portable PC.

There are just a couple of minor irritations. Flipping up the keyboard to swap batteries requires an unintuitive sequence of steps. Also, the AC adapter uses an odd, oversize connector that doesn't fit snugly into the PC.

In every other respect, this is a first-class notebook with first-class service policies: a three-year parts warranty (labor is covered for the first year), free on-site service, and round-the-clock phone support. Readers who responded to our fax-back survey give IBM high praise for system reliability. The winning combination of fast performance, an oversize screen, and high-quality audio makes this ThinkPad a natural for anyone who gives multimedia presentations on the road.

10 Austin Business Audio P-90

LAST REVIEWED: March 1996

PROS: Fast, well built; 720MB hard drive; fax-modem; built-in sound, speakers, and microphone

CONS: Heavy (8.2 pounds); uncomfortable trackball; 3.5-hour battery life shorter than we like

Budget Notebooks

1 Dell Latitude LX 4100D

LAST REVIEWED: March 1996

PROS: Inexpensive, fast for a DX4-100, long battery life, excellent documentation

CONS: Somewhat dull screen, cramped keyboard

If you want good performance in an inexpensive notebook, don't overlook the Latitude LX 4100D. It costs only $1928, and with 8MB of RAM it's faster than every other notebook on the Budget chart except its higher-end sibling—the Latitude LX 4100T—and the new Hertz Z-Optima 486 D100 X4E.

We have some quibbles, such as the cramped keyboard. The centered trackball, however, rolls smoothly. The low price involves one major compromise: You get a small 420MB hard drive. On the other hand, the Latitude LX 4100D also features some nice extras, like a floppy drive that pops out for a second battery, and a number of useful system management utilities. The battery life of over 5 hours is among the best on the budget notebooks chart, and the price includes a 10.4-inch color dual-scan screen (although we wish it were brighter) and a three-year warranty. (If you opt for one-year coverage, the LX 4100D sells for just $1799.) Dell's extensive documentation for the Latitude LX 4100D is first-rate.

2 Toshiba Satellite T2130CS

LAST REVIEWED: March 1996

PROS: Well designed and well constructed, low price, excellent reliability scores

CONS: Fairly sluggish performance, mediocre battery life

DX4-75s are still the mainstays of the budget notebooks chart. This month, a whopping $400 price drop to $1599 returns Toshiba's DX4-75 Satellite T2130CS to Best Buy status. It's still the fastest DX4-75 notebook on the chart. Its configuration is typical for a budget contender, with 8MB of RAM and a 503MB hard drive. The 3-hour battery life is fairly short. The 10.4-inch dual-scan color screen supports only 256 colors, although it is otherwise quite good. You can't display on both the built-in screen and an external monitor at the same time, however. That said, the 7.2-pound traveling weight is easy on the shoulder, Toshiba enjoys consistently high ratings for reliability, and the company's three-year warranty is exemplary. We especially liked the well-written documentation that came with the system.

3 Dell Latitude LX 4100T

LAST REVIEWED: March 1996

PROS: Fastest notebook on the budget chart, 16MB of RAM, 810MB hard drive

CONS: Fairly high $2699 price

4 NEC Versa 2000D

LAST REVIEWED: March 1996

PROS: Excellent $1599 price, nice color dual-scan screen, 5-hour battery life

CONS: Very slow performance for a DX4-75; tiny 360MB hard drive

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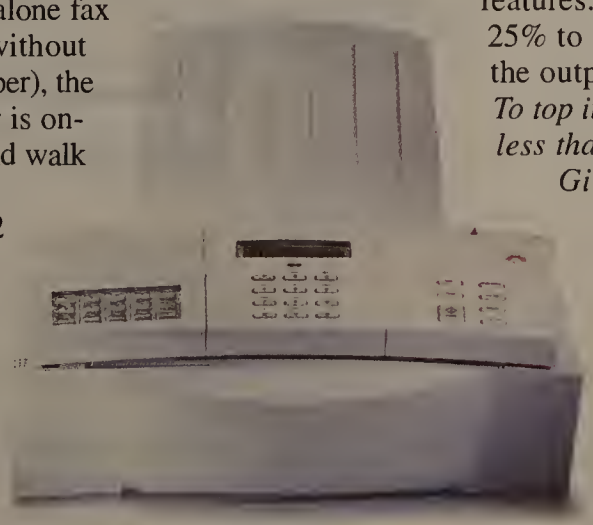

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The Lumina 2000 can scan text, images or pictures (up to 400 dpi) into your PC for later review, editing and storage. OCR software lets you create text files from scanned documents and edit them in your favorite word processing application. It features a 30-page automatic document feeder. And the Lumina 2000 uses the Windows **TWAIN** standard, so you can scan into most graphic and document management programs.

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5 Hertz Z-Optima 486 D100 X4E

NEW THIS MONTH

PROS: Outstanding price, good performance

CONS: Mediocre battery life, smallish display

Debuting this month at number five in the budget notebooks chart, the Hertz Z-Optima 486 D100 X4E is the first notebook we've seen from a company whose desktop systems we've reviewed many a time. It's a solid value for bargain hunters who are willing to make a few compromises. The reasonable $2195 price buys you a DX4-100 with an impressive 16MB of RAM, a big 810MB hard drive, and an active-matrix color screen. Among this month's budget contenders, the Hertz landed a PC WorldBench score of 98, ranking second only to the 109 rating of the $2699 Dell Latitude LX 4100T, also a DX4-100.

The tempting price comes at the expense of features beyond the basics, however. The system's ergonomics are generally pretty good, with a comfortable wrist-rest area, a marble-size trackball that works pretty well, and a keyboard that's fine except for an unusually small spacebar. But you don't get built-in sound, an infrared port, or other equipment that's becoming standard on most notebooks. (Hertz does sell a $295 CD-ROM/sound module that you can swap out with the system's floppy drive.)

Hertz

At 8.2 pounds, the Hertz Z-Optima 486 D100 X4E is also heavy, especially considering it has no built-in multimedia components to weigh it down. Its 9.5-inch color screen, while crisp and clear, is cramped compared to the larger displays of all but one of the other budget notebooks. And the 2.5-hour battery life is disappointing.

None of the *PC World* readers responding to our fax-back survey have commented on Hertz's reliability and service, but although the company is small, it has been in business for a number of years. Hertz's support package is adequate; it includes a warranty that covers parts for three years and labor for one year. Technical support is available weekdays only, however. If you want good performance, and you don't use multimedia or mind short battery life, the Z-Optima 486 D100 X4E is a good deal.

6 NEC Versa 2000C

LAST REVIEWED: March 1996

PROS: Nice-looking color active-matrix screen, 14.4-kbps internal fax-modem

CONS: Sluggish performance for a DX4-75, short 3.3-hour battery life

7 AST Ascentia 950N/75

NEW THIS MONTH

PROS: Built-in speakers and microphone, big hard drive, 5-hour battery life

CONS: Performance is slow for a Pentium-75

Our main complaint about the $2455 AST Ascentia 950N/75 is its poor performance. If only this well-designed little Pentium-75 were faster, it would rank near the top of our budget notebooks chart. Unfortunately, it runs more like a fast DX4-100 machine than a P-75. That fairly major knock delivered, we can find little else to fault. We tested this system in March, but at that time it was too expensive for the budget list. A $544 price cut now makes it eligible.

AST

AST really knows how to put together a classy notebook, and the company has racked up an impressive collection of Best Buys in the last several years. Ascentia models in particular have done well in our reviews. The Ascentia 950N/75 has some of the features that attracted us to its predecessors. It weighs only 7.2 pounds, and it comes equipped with 8MB of RAM, a big 810MB hard drive, built-in sound and speakers, and an infrared port for wireless data transfer. In our tests, we appreciated the brightness and clarity of its 10.3-inch color active-matrix screen. The battery life is also good at more than 5 hours. You even get a three-year warranty. So although it's not as fast as you would expect a Pentium to be, this Ascentia is still a good value.

8 Compaq Contura 420CX

LAST REVIEWED: April 1996

PROS: Well built, long 5.3-hour battery life, three-year warranty, good reliability

CONS: High $2549 price for a DX4-75 with a small 420MB hard drive

9 Compaq Contura 430C

LAST REVIEWED: March 1996

PROS: Well designed and well made, nice keyboard, solid 4.8-hour battery life

CONS: Fairly slow for a DX4-100

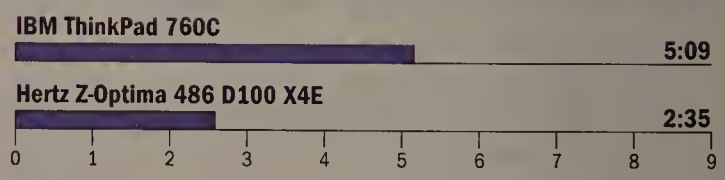
10 Texas Instruments Extensa 450

LAST REVIEWED: April 1996

PROS: Attractive $1798 price, dazzling dual-scan color display

CONS: Slowest notebook on the chart, tiny 340MB hard drive

TEST REPORT Battery Life



Time in hours:minutes.

Methodology We drain and fully recharge the battery twice and set power-saving options to match a consistent profile where possible. Office workers use Windows 95 applications, periodically saving and allowing regular idle time. Notebooks are rotated among workers. We report the time elapsed when the notebook shuts itself off.

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*Ziff-Davis study, *PC Computing*, November 1994. Kingston Technology Corporation, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699.

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FEATURES COMPARISON This Month's Contenders—Desktops

● = Yes ○ = No

n/a = not applicable

Standard features	Compaq ProLinea 575e	Dell OptiPlex GXMT 5166	HP Vectra VL Series 4 5/166 MT	Micron P150 Millennia	NEC PowerMate P166	Netis N500 Media
Street price as of 3/2/96 [1]	$1754	$3549	$3915	$2898	$3399	$2048
CPU	Pentium-75	Pentium-166	Pentium-166	Pentium-150	Pentium-166	Pentium-100
CPU or upgrade socket	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF	320-pin ZIF
BIOS	EPP BIOS v1.1 8/23/95	Y10 10/23/95 v1.10	EPP v3 9/17/95	Phoenix v4.04 10/27/95	Phoenix v4.05.I 10/05/95	CBO v1.00.02 5/17/95
Installed/maximum RAM (MB)	8/136	32/128	16/128	16/128	16/128	16/128
SIMM sockets/number free	4/4	4/2	6/4	4/2	4/2	4/2
Secondary RAM cache installed/ maximum (K)	0/256	256/512	256/256	256/256	256/512	256/512
Case style	compact	minitower	minitower	minitower	minitower	compact
Free externally accessible 3½-inch/5¼-inch drive bays	0/1	0/2	0/2	0/2	0/2	1/2
Free internal 3½-inch/5¼-inch drive bays	0/0	1/0	1/0	0/0	2/0	1/0
Free 16-bit ISA expansion slots [2]	4	6	3	3	4	3
Free 32-bit PCI expansion slots [2]	1	2	2	3	1	3
Hard disk	Quantum TRB635A	WD Caviar 31600	Quantum Fireball 1280	Quantum Fireball 1280A	WD Caviar 31600	WD Caviar AC31600
Size (MB)	630	1624	1280	1280	1624	1625
Adapter	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE	integrated EIDE
Floppy drives (MB)	1.44	1.44	1.44	1.44	1.44	1.44
Graphics adapter	integrated	integrated	Matrox Millennium	Diamond Stealth64 Video VRAM	Matrox Millennium	Diamond Stealth64 Video VRAM
Installed memory (MB)/type	1/DRAM	2/VRAM	2/WRAM	2/VRAM	2/WRAM	2/VRAM
Monitor	Compaq 150	Dell D1728D-LS	HP D2806B	MAG DX15T	NEC MultiSync XV15+	Proton GM 1563M
Tube/viewable diagonal (inches)	15/13.6	17/15.4	15/13.5	15/14.1	15/13.8	15/13.9
Dot pitch (mm)	.28	.28	.28	.26	.28	.28
Modem speed for fax/data (kbps)	n/a	n/a	n/a	n/a	n/a	n/a
Sound board	n/a	Creative Labs Vibra 16S	Creative Labs Vibra 16S	OEM (Creative Labs Sound Blaster 16)	Opti 930	Creative Labs Vibra 16S
CD-ROM drive	n/a	NEC 273	Sony CDU76E	Teac CD-56E	Teac CD-56E	Acer Sertek C645
Data transfer rate (K/sec)	n/a	600	600	900	900	600
Parallel/serial/mouse/SCSI ports	1/1/1/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/1/0	1/2/0/0
Service and support						
Warranty for parts/labor (years)	3/3	3/3	3/3	5 [3]/1	3/3	1/3
30-day money-back guarantee	● [4]	●	○	●	●	●
On-site service first-year price	free	free	free	free	free	free
Repair turnaround policy (days at service center)	2	2	5	2	3	2
Daily toll-free phone support (hours)	24	24	11	24	24	10
Weekend support	●	●	○	●	●	● [5]
On-line support sites	AOL, BBS, CIS, Prodigy, WWW	AOL, BBS, CIS, Prodigy, WWW	AOL, BBS, CIS, WWW	BBS, WWW	AOL, BBS, CIS	BBS, WWW
Automated fax support	●	●	●	●	●	●

[1] All systems priced as configured with Windows 95, VGA and color monitor, keyboard, and mouse.

[2] One less ISA slot available when all PCI slots are filled, and vice versa.

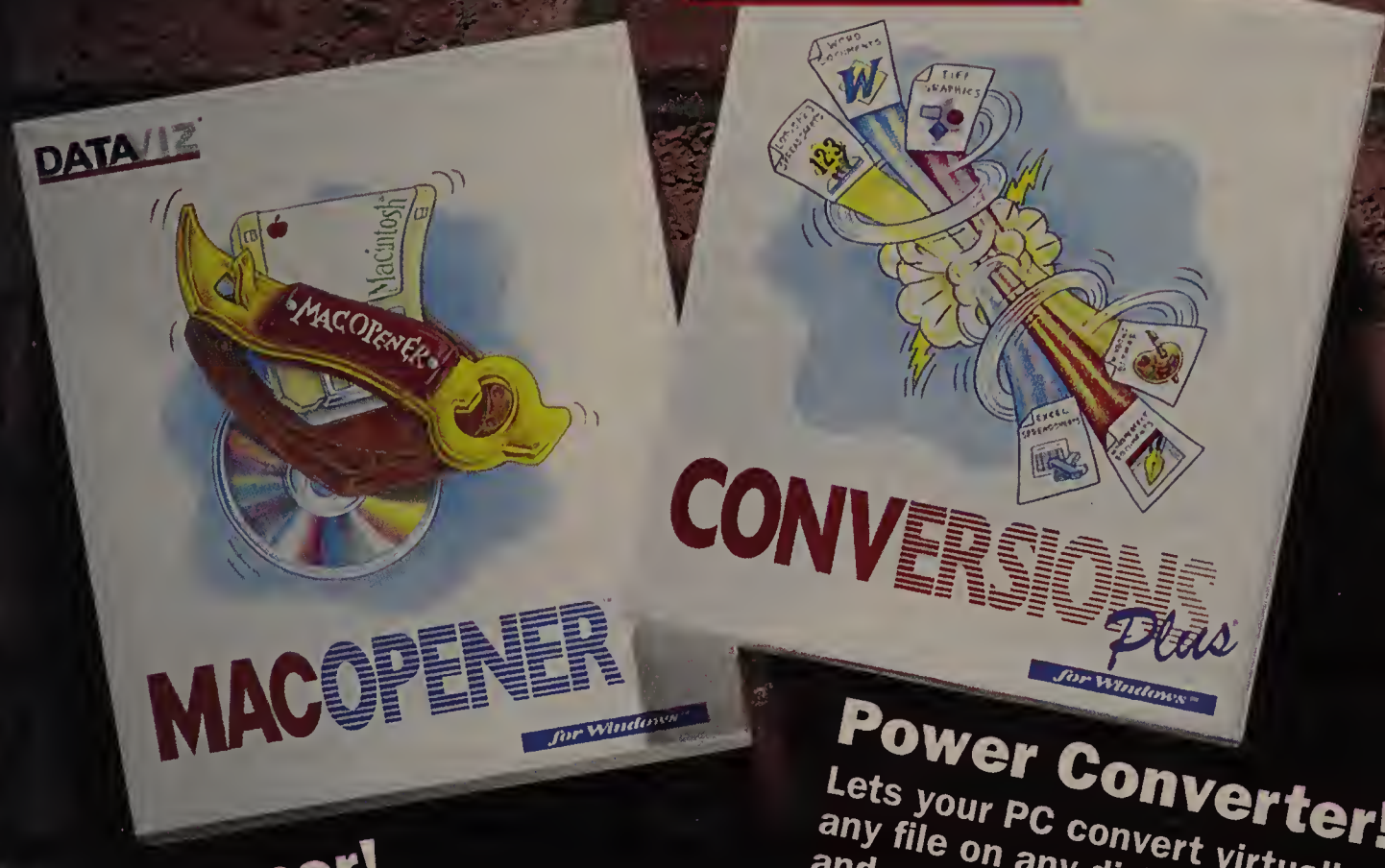
[3] On CPU and main memory; three years on all other parts.

[4] If purchased through Compaq DirectPlus.

[5] Saturdays only.

Do Files You Can't Use Have You Up Against A Wall?

WINDOWS MAGAZINE
1996 WIN 100



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Desktop Snapshots

These systems were tested along with the others but didn't score high enough to reach the Top 20 charts.

Acma sPower 133

PROS: Good documentation

CONS: Slow, no weekend support

This $2495 P-133 minitower was sluggish. Acma has pretty good documentation and a three-year parts warranty, but you pay for labor after the first year, and phone help is weekdays only. *Acma Computers, 800/786-6888, 510/623-1212* **Reader service no. 689**

Compaq 5100e

PROS: Uncluttered interior, first-rate service and support

CONS: Extremely slow, bare-bones setup, no free drive bays

This $2399 P-100 has 8MB of RAM and no secondary cache, so it lags behind most P-75s we've tested. It has no free external drive bays. Compaq's reliability and service are tops. *Compaq Computer, 800/345-1518* **Reader service no. 690**

Compaq Presario 9240, 9250, 9660

PROS: Superb design, great documentation, top reliability

CONS: Very slow performance, pay-per-call tech support

Three new Presarios are well designed, but see how they run: The $3593 P-166 9660 is only as fast as an average P-120. The $3393 P-133 9240 and the $3094 9250 P-150 are even slower. And Compaq charges $35 for support calls not involving defects. All have 15-inch monitors with detachable speakers and 28.8-kbps voice fax-modems. The 9250 and 9660 have 2140MB hard drives and 6X CD-ROM drives. The 9240 has a 1275MB hard disk and a 4X CD-ROM/rewritable optical combo. *Compaq Computer, 800/345-1518* **Reader service no. 692**

Multiwave Ultra Power

PROS: Fast performance, full tower case

CONS: Mediocre support policies

Your $2425 buys a speedy P-166 tower with wavetable sound, 6X CD-ROM drive, and a 17-inch display. But the vendor offers just a one-year warranty and no free on-site service. *Multiwave Technology, 800/234-3358, 818/330-7030* **Reader service no. 693**

Netis N5166 Home Office

PROS: Low price, wavetable sound card

CONS: Mediocre performance, unimpressive documentation

For $2850, this P-166 minitower has it all: 16MB of RAM, a 1624MB hard drive, a 4X CD-ROM drive, a 14.4-kbps modem with voice mail, and wavetable sound. But it's slow, and Netis's warranty covers parts for only one year. *Netis Technology, 800/577-7526, 408/263-0368* **Reader service no. 694**

NMC Expert Plus

PROS: Fast; 17-inch monitor; phase-change optical drive

CONS: High price, crowded interior, no weekend support

A phase-change rewritable optical/4X CD-ROM combo comes with the $3499 price. This P-133 minitower is as fast as some P-150s we've seen, but the interior is messy, and our keyboard adapter kept coming loose. *National Microcomputers, 800/800-4662, 801/265-3700* **Reader service no. 695**

PerComp P166 Professional

PROS: Strong multimedia features, good support policies

CONS: Slow; small hard drive

This $2899 P-166 desktop has great specs: a 4MB WRAM Matrox graphics card, wavetable sound, Altec-Lansing speakers with subwoofer, and a 17-inch display. But it's one of the slowest P-166s we've tested. PerComp offers a three-year warranty and seven-day support. *Percomp Microsystems, 800/856-6688* **Reader service no. 696**

Polywell Poly 5166P8

PROS: Fast; five-year labor warranty

CONS: Small hard drive, no free on-site service

Polywell's $3095 minitower was fast, but the setup (16MB of RAM, 1080MB hard drive, sound card, 4X CD-ROM drive, 17-inch monitor) is typical for this price. The five-year labor warranty stands out. *Polywell Computers, 800/999-1278, 415/583-7222* **Reader service no. 697**

Robotech Cobra XLT 166S

PROS: Good performance, generous multimedia configuration

CONS: Limited support hours

This P-166 tower costs a high $3899, but performance is good. It comes with a 17-inch display, a 6X CD-ROM drive, wavetable sound, and a 28.8-kbps voice modem. But a messy interior blocks expansion slots and SIMM sockets. Phone help is available business hours only. *Robotech, 800/255-2215, 801/565-0645* **Reader service no. 698**

Sys Technology Performance P166T

PROS: Fast performance, high-end multimedia components

CONS: Meager support policies, unrefined design

This $3799 minitower is among the fastest P-166 systems with 16MB of RAM. The nice setup includes a 1280MB hard drive, a Matrox video card with 4MB of WRAM, a 28.8-kbps modem, a 4X CD-ROM drive, sound, and a 17-inch monitor. But it's hard to maneuver inside, and Sys offers a mere one-year warranty with no on-site service or toll-free support. *Sys Technology, 800/613-9963, 714/821-3900* **Reader service no. 699**

Sys Technology Performance Pro 150

PROS: Very fast; high-end multimedia bundle

CONS: Expensive, skimpy support policies

This $4699 Pentium Pro 150 minitower finished our PC WorldBench tests about as quickly as the fastest P-166 machines, but it costs far more. It's similar to the Sys system reviewed above, except this unit has 32MB of RAM and a 15-inch monitor. Sys Technology's support policies are spare. *Sys Technology, 800/613-9963, 714/821-3900* **Reader service no. 700**

Notebook Snapshots

These notebooks were tested along with the others but didn't score high enough to reach the Top 20 chart.

AMS SoundPro DX4-75

PROS: Low price, three-year warranty

CONS: So-so sound, poor documentation, somewhat heavy

For only $2107 the SoundPro delivers a 10-inch color active display and a 540MB hard drive. The 3.3-hour battery life is adequate. But its sound is buzzy, and its speakers are weak. The trackball and mouse buttons feel cheap, and the bulky AC adapter contributes to a rather heavy traveling weight of 8.2 pounds. The printed manual is sketchy. AMS does offer a full three-year warranty. *AMS, 800/886-2671, 818/814-8851* **Reader service no. 701**

You'll have to search the galaxy to find a more realistic multimedia experience than this.

There's not much doubt that intelligent life forms exist somewhere else in the universe. The question is: Are their multimedia systems as advanced as ours?

The new **Sound Blaster 8x Kits** make your current multimedia system seem like something out of a history book. They give you a brain-blistering 8x CD-ROM drive that makes all your CD-ROM software perform at warp speed. The 8x drive uses an IDE interface and is compatible with multiple standards including Photo CD and CD EXTRA.

You also get one of the hottest sound cards on the planet — the Sound Blaster 32 PnP. It delivers the brilliant realism of **32-note polyphony** and **wave-table synthesis**, adding new detail and richness to both sound effects and music. It also features Creative's **3D Stereo Enhancement Technology** to make your whole system sound better.

Since the search for bargains is universal, a fat collection of the hottest new games and software comes with every kit. Sound Blaster Performance 8x is designed for the multimedia fanatic. Sound Blaster Discovery CD 8x takes the whole family to the cutting edge. Both come with a pair of Sound Blaster speakers powerful enough to attract low-flying spacecraft. If you're looking for the ultimate CD-ROM upgrade, Blaster CD 8x gives you mach speed and great software to boot.

Great software value in every kit!

So the next time you see aliens from your window, just point them to the nearest Creative Labs dealer. Think of it as a way to promote harmony in the universe.

Introducing Sound Blaster 8x Multimedia Upgrade Kits

	CD-ROM	Speakers	Sound Card					
	CD-ROM Drive	Stereo Speakers	Play Audio CDs and Games	Record 16-bit audio	Wave-Table Synthesis	32-Note Synthesizer	128 Real Instrument Sounds	3D Stereo Enhancement
Typical Multimedia System	4X							
Sound Blaster Multimedia Kit	8X							

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Circle 54 on reader service card

For more information call our Faxback Service at 405-372-5227 or Customer Service at 800-998-5227 x134. © 1996 Creative Technology Ltd. Sound Blaster and Creative Labs are registered trademarks and the Sound Blaster compatibility logo, Sound Blaster Performance Sound Blaster Discovery CD and Blaster CD are trademarks of Creative Technology Ltd All rights reserved

Canon Innova Book 1100 P75, P75T

PROS: Fast performance, excellent on-screen documentation

CONS: Poor battery life, streaky display, one-year warranty

Both of these Pentium-75s have 8MB of RAM, 810MB hard drives, and clear built-in sound. The $3499 P75 is fast, and it weighs just 6.6 pounds. Its 11.3-inch dual-scan color screen looked streaky, however, and its 1.25-hour battery life is meager. The P75T, which weighs 7.6 pounds, has an 11.1-inch color active screen that can display 65,536 colors at 800 by 600 resolution. But its battery life of 46 minutes is abysmal, and its $4649 price is very high. Canon's one-year warranty is brief, but tech support is open long hours and weekends. *Canon Computer Systems, 800/848-4123, 714/438-3000* **Reader service no. 702**

FEATURES COMPARISON This Month's Contenders—Notebooks

● = Yes ○ = No n/a = not applicable

Standard features	Hertz Z-Optima 486 D100 X4E	IBM ThinkPad 760C
Street price as of 3/2/96 [1]	$2195	$6184
CPU	DX4-100	Pentium-90
Traveling weight (pounds) [2]	8.2	8.2
Width x depth x height (inches)	11.5 x 8.75 x 2.25	11.6 x 8.25 x 2
Installed/maximum RAM (MB)	16/20	16/40
Secondary RAM cache installed/maximum (K)	0/0	256/256
Installed/maximum hard disk (MB)	810/1024	720/1080
Removable hard disk	●	●
Screen type	color active	color active
Viewable screen diagonal (inches)	9.5	12.1
Maximum screen colors	256	256
Simultaneous LCD and external monitor	●	●
Highest resolution of external monitor	1024 x 768	1024 x 768
Mouse/keyboard ports	●/● [3]	●/● [3]
Cursor keys in inverted T	●	●
Dedicated page-control keys	●	●
All 12 function keys dedicated	●	●
Standard <Ctrl> and <Alt> layout	○	○
Built-in pointing device	TrackPoint	trackball
CD-ROM drive speed	n/a	n/a
Fax/data modem speed (kbps)	n/a	14.4/14.4
Docking station available	○	●
PC Card slots Type II/III	2/1 [4]	2/1 [4]
Power management		
Type of battery	NiMH	lithium ion
Suspend button	●	●
Suspends when case closed	○	●
Service and support		
Warranty for parts/labor (years)	3/1	3/1
30-day money-back guarantee	○	○
On-site/replacement service first-year price	n/a	free
Repair turnaround policy (days at service center)	2	2
Daily toll-free phone support (hours)	11	24
Weekend support	○	●
Online support sites	○	AOL, BBS, CIS, Prodigy, WWW
Automated fax support	○	●

[1] All notebooks priced as configured with Windows 95, color VGA display, and mouse or other pointing device. Street price is direct or based on vendor estimate.

[2] Includes computer, adapter, power cord, floppy drive, and CD-ROM drive if notebook has one.

[3] Mouse port doubles as keyboard port.

[4] Type III slot alternatively accepts two Type II devices.

Canon Innova Book 1100 P90

PROS: Large hard disk, excellent on-screen documentation

CONS: Short battery life, streaky display, one-year warranty

This 7.4-pound Pentium-90 notebook is almost identical to the Innova Book 1100 P75 and P75T. At $4199, it costs $700 more than the InnovaBook 1100 P75, but it's only slightly faster. It has the same short battery life (1.25 hours) and the same poor screen. *Canon Computer Systems, 800/848-4123, 714/438-3000* **Reader service no. 704**

Canon NoteJet IIIcx

PROS: Built-in printer/scanner, roomy display

CONS: Mediocre battery life, high price, one-year warranty

It's a notebook! It's a printer! It's a scanner! The newest addition to Canon's unique NoteJet line includes a built-in color ink jet printer and gray-scale scanner. Their quality is decent, but performance is slow. This 11.4-pound system is more luggable than it is portable, but it still fits into a briefcase. The pricey $6699 NoteJet comes with a P-90 CPU, 8MB of RAM, an 810MB hard disk, and an 11.8-inch color active screen. Performance is typical for the system's CPU class; the 2.3-hour battery life is mediocre. *Canon Computer Systems, 800/848-4123, 714/438-3000* **Reader service no. 705**

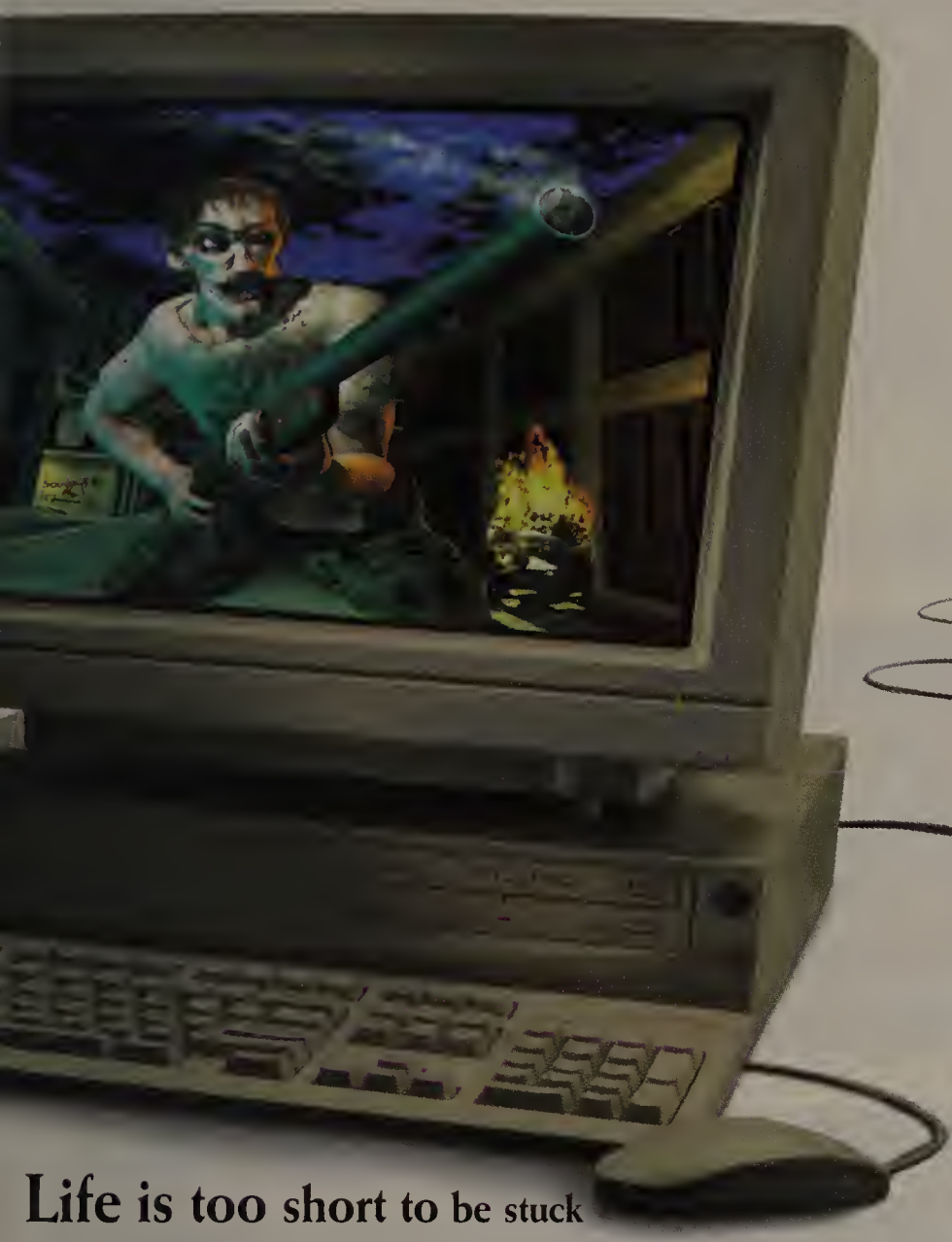
Compaq LTE 5100 Model 810 CTFT

PROS: High-quality display and sound

CONS: Slow, expensive

Compaq's LTE 5100 notebook comes in two flavors, each P-90s with 8MB of RAM standard. In April we tested a version with 16MB of RAM, a 2X CD-ROM drive, and the fastest P-90 notebook PC WorldBench score we'd seen. The $5399 LTE 5100 Model 810 CTFT we review this month has 8MB of RAM and no CD-ROM drive (you can add one for $389). It comes with a 10.4-inch color active screen, good built-in sound, and Compaq's strong service and reliability. But it's pricey, and compared to its peers it's slow. *Compaq Computer, 800/345-1518* **Reader service no. 706**

The audio experience from our new Sound Blaster is so real, when you find out what you've been missing, you'll just die.



Life is too short to be stuck

with an ordinary sound card. Whether you're a hard-core gamer or an audiophile, the new Sound Blaster® AWE32™ PnP is simply to die for.

The AWE 32 is the breakthrough audio fanatics have been waiting for. It delivers the shocking realism of professional wave table synthesis – which uses actual recordings of real sound effects and musical instruments. With 32-note polyphony, it can play up to 32 notes simultaneously, adding deadly new detail and richness to your favorite games and software.

The AWE 32 is the first sound card with 3-D Positional Audio.™ Suddenly you can hear the metallic click of the shotguns trigger over your left shoulder. It also features Creative's 3D Stereo Enhancement™ Technology, which makes your whole system sound fuller and more powerful so you'll have absolutely nowhere to hide.

Really want to push the envelope? Our upgradeable SoundFont® technology lets you add new sounds. Or you can add up to 28 MB of memory to create your own sound library. We even included software for editing music and sound effects. And, of course, the AWE 32 is fully Plug and Play compatible and works with Windows®95, Windows 3.1 and DOS. So installation is a no-brainer.

To experience the ultimate reality, team the AWE32 with a bullet fast Blaster CD™ 8x and Sound Blaster Speakers™— available at your nearest Creative Labs dealer. But do it today because tomorrow may be too late.

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Circle 56 on reader service card

HP OmniBook 5000 CTS

PROS: Large hard disk, very fast, video and MIDI ports

CONS: High price, so-so battery life

This $6295 P-120 is the fastest notebook we've tested—and it might have made the power notebooks chart if it weren't so expensive. It doesn't have a CD-ROM drive, but it has 16MB of RAM; a 1280MB hard disk; a 10.5-inch color active screen; decent sound; ports for a monitor and MIDI devices; and a large, easy-to-use trackball. Its 3-hour battery life is only half what some P-120s can manage, though. HP offers a full three-year warranty and free on-site service. *Hewlett-Packard, 800/752-0900, 303/635-1000* **Reader service no. 707**

Twinhead SlimNote 6150TX

PROS: Fast, inexpensive, has CD-ROM drive

CONS: Poor battery life, skimpy manuals, one-year warranty

This $3200 Cyrix 5x86–based notebook performs like a comparably equipped Pentium-90 but costs several hundred dollars less. It has a crisp 10.5-inch active-matrix color screen, a CD-ROM drive, and built-in sound. But its 1.3-hour battery life is brief compared to other Cyrix 5x86 notebooks we've tested. And its 9.8-pound traveling weight is heavy, even considering the multimedia features. Twinhead's warranty for parts and labor is just one year, with no weekend support. *Twinhead, 800/995-8996, 408/945-0808* **Reader service no. 708**

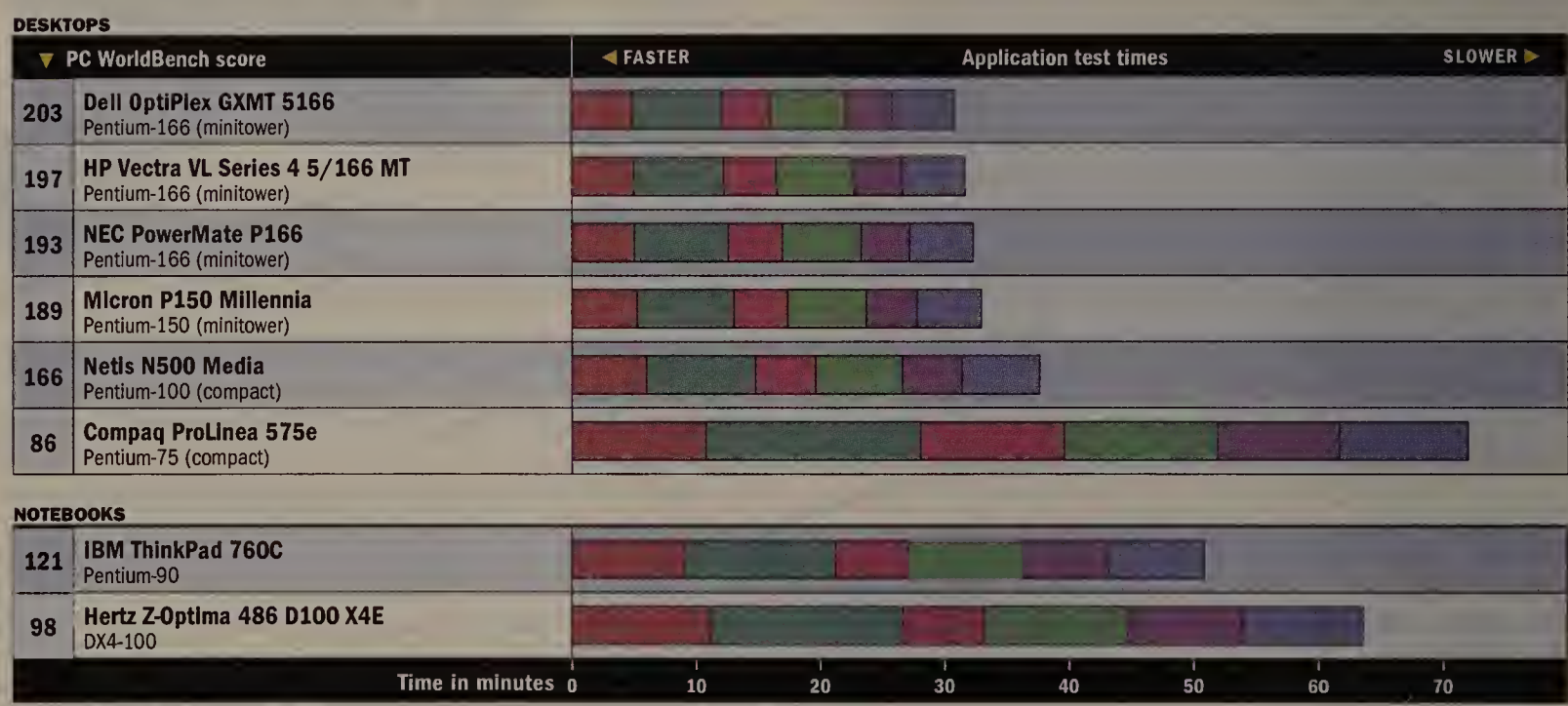
ZDS Z-Note GT

PROS: Excellent performance, large hard disk, CD-ROM drive, highly customizable, strong support policies

CONS: Poor battery life, terse documentation

It costs a whopping $5268, but this 9.2-pound multimedia system is the fastest P-90 notebook we've tested. It has a massive 1330MB hard drive, and a bay that can hold either the included floppy drive, a 2X CD-ROM drive, or a second hard disk or battery. That battery option is vital considering the Z-Note's dismal 1.5-hour battery life. We also thought the built-in speakers sounded faint. ZDS's support policies are top-notch. *Zenith Data Systems, 800/582-0524, 847/808-5000* **Reader service no. 709**

TEST REPORT This Month's Contenders



Systems are arranged in order of overall performance from best to worst, based on the normalized, weighted scores from six tests.

Methodology We test each system as supplied by the manufacturer. All tests are performed under Windows 95 configured with an HP LaserJet IV as the default printer. We disable any power-saving features. We set the video resolution to 800 by 600 in 256 colors, using the supplied video driver where possible. We load the test applications and files and the test automation software and scripts.

Word 7.0 for Windows 95 (25 percent of weighting)
We open multiple documents, format text, copy and paste, close files, scroll, and save files. We also change document views, insert text, check spelling, repaginate, count words, print preview, and mail merge.

Excel 7.0 for Windows 95 (20 percent)
Using a variety of worksheets including an automobile statistics sheet, a multisheet federal income tax workbook, a variable-rate mortgage worksheet, and an analysis of life insurance policies, we perform common functions and tasks including opening a file, formatting, data entry, sorting, recalculation, data query, print preview, printing, and saving the file.

Picture Publisher 6.0 for Windows 95 (15 percent)
Using an assortment of graphics, we perform functions including opening and saving files, zooming, scrolling, palette changes, posterization, image masking, hue shifting, feathering, and copying and pasting.

Paradox 5.0 for Windows (15 percent)
We simulate an order entry system. We import tables and post a series of orders, looking up customer and product data in the process. We perform a variety of queries, edit data, and create reports.

WordPerfect 6.1 for Windows (15 percent)
We open different-size files, search for text, change fonts, enter text, save files, and jump to a particular page. We also check spelling, copy and paste, scroll, change document views, and insert one file into another.

1-2-3 release 5 for Windows (10 percent)
Same functions as the Excel test.

Data based on tests designed and conducted by the PC World Test Center.
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PC Magazine – Sept. 12, 1995, on the SyncMaster 17GLi and 17GLsi monitors.

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September 12, 1995
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Dot Pitch	.28	.28	.26
PC Compatibility	1280x1024@60Hz	1280x1024@60Hz	1280x1024@80Hz
Mac Compatibility	1024x768@75Hz	1024x768@75Hz	1152x870@75Hz
Color Temperature Selection	•	•	•
UltraClear Coating™		•	•
Limited Warranty	3 Years	3 Years	3 Years

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Circle 198 on reader service card

RELIABILITY AND SERVICE MONITOR

Win a DTK Quin 54M/P100

Have you ever contacted your PC maker for service and support? Or has your PC been trouble-free? Tell us about it! Fill out and fax in the questionnaire below—even if you have no problems to report, and even if you have responded to this survey before—and we'll enter you in a drawing to win a DTK Quin 54M/P100, a Best Buy Pentium-100 PC in this month's Top 20.

HOW TO ENTER: FOR BEST RESULTS, PHOTOCOPY THIS PAGE. Fax your completed survey to 415/357-4522. Do NOT fax a cover page. Or mail it to *PC World*, Box 5-SS, c/o 800-SCAN, 543 Howard St., San Francisco, CA 94105-3013. Surveys must be received by May 31.
PRIZE: One entry per person. IDG employees and their families are not eligible. One prize will be awarded through a random drawing. *PC World* will make reasonable efforts to contact winners by telephone and fax. If *PC World* is unable to do so within 30 days of the drawing, a new winner will be selected. No purchase necessary. Void where prohibited by law.
HOW TO FILL OUT THE FORM: Print your name (block capital letters) and your fax number, and fill the circles for each digit of your daytime phone number. Then fill out the questionnaire. AVOID GOING OUTSIDE THE LINES!

LAST, FIRST NAME

FAX NUMBER — —

ZIP CODE

Please fill in your daytime phone number below.

1	○	○	○	○	○	○	○	○	○	○
2	○	○	○	○	○	○	○	○	○	○
3	○	○	○	○	○	○	○	○	○	○
4	○	○	○	○	○	○	○	○	○	○
5	○	○	○	○	○	○	○	○	○	○
6	○	○	○	○	○	○	○	○	○	○
7	○	○	○	○	○	○	○	○	○	○
8	○	○	○	○	○	○	○	○	○	○
9	○	○	○	○	○	○	○	○	○	○
0	○	○	○	○	○	○	○	○	○	○

How did you get this copy of *PC World*?
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ABOUT YOUR PC

Who is the manufacturer of the PC you use most frequently?

○ Acer ○ Acma ○ ALR ○ Apple ○ AST ○ AT&T (NCR) ○ Austin (IPC) ○ Axik ○ Blackship ○ Canon ○ Compaq ○ Compudyne
○ Computrend ○ Comtrade ○ CTX ○ Dell ○ Diamond ○ Digital (DEC) ○ DTK ○ EPS ○ Epson ○ Everex ○ Future Tech ○ Gateway 2000
○ Hewlett-Packard ○ HiQ ○ Hyundai ○ IBM ○ Insight ○ Intelesys ○ Leading Edge ○ Micro Express ○ Micron ○ Midwest Micro ○ MIS ○ Nat'l Micro
○ NEC ○ Netis ○ Packard Bell ○ Panasonic ○ PerComp ○ Pionex ○ Polywell ○ Quantex ○ Robotech ○ Samsung ○ Sharp ○ Swan
○ Tangent ○ Texas Instruments ○ Toshiba ○ Twinhead ○ USA Flex ○ Vektron ○ VTech (Expotech, Laser) ○ WinBook ○ Zenith (ZDS) ○ Zenon ○ Zeos ○ Other

What size is this PC?
○ Desktop ○ Notebook/laptop ○ Handheld

What is the CPU?
○ PowerPC ○ Pentium ○ 80486 ○ 80386 ○ Other

Where did you buy this PC?
○ Local dealer ○ Mail/phone order ○ Direct from field sales force ○ Membership discount store ○ Computer superstore ○ Home electronics store ○ Retail store ○ Value-added reseller ○ Other

After ordering, how long did it take to get your PC?
○ Less than 1 week ○ 1–2 weeks ○ 3–4 weeks ○ More than 4 weeks

Who set up your PC?
○ Dealer/retailer/VAR ○ Staff computer technician ○ Self or coworker

Where do you use this PC? ○ At home/home office ○ At work ○ Both

WHEN YOU FIRST GOT YOUR PC

When did you buy this PC? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

When you first set up your PC, were any components "dead on arrival" (DOA)?
○ Yes ○ No ○ Don't know

If so, which component was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

Did your problem occur only after you added your own hardware or software?
○ Yes ○ No ○ Don't know

Would you buy this brand of PC again?
○ Yes ○ No ○ Not sure

How many times have you had a problem with this PC?
○ No problem ever ○ One ○ Two ○ Three ○ Four ○ More than four

If you have had a problem that you have not reported in a previous survey, please fill out the right column. If you are reporting a DOA for the first time, skip to the service section.

NEW PROBLEM REPORT

Please answer for the most recent problem—*other than DOA*—not reported in a previous survey.

When did this problem occur? (Specify month and year.)

○ Jan ○ Feb ○ Mar ○ Apr ○ May ○ June ○ July ○ Aug ○ Sept ○ Oct ○ Nov ○ Dec
○ 91 ○ 92 ○ 93 ○ 94 ○ 95 ○ 96

How long was this after you purchased your PC?
○ Less than 1 month ○ 1–3 months ○ 4–6 months ○ 7–12 months ○ More than 12 months ○ Not sure

Did the problem occur as a result of adding new hardware or software?
○ Yes ○ No ○ Don't know

Did the problem occur under warranty?
○ Yes ○ No ○ Don't know

What was the problem finally identified as? (Mark all that apply.)
○ Faulty component ○ Incorrectly installed software ○ Wrong configuration ○ Faulty peripheral ○ Device conflicts ○ OS problem ○ Other ○ Don't know

If a component failed, which one was it? (Mark all that apply.)
○ Battery ○ CD-ROM ○ CPU ○ Floppy drive ○ Graphics/video board ○ Hard drive ○ Keyboard ○ Memory ○ Modem/fax board ○ Monitor/screen ○ Motherboard ○ Mouse ○ Power supply ○ Sound board ○ Other

SERVICE

Please use this section to describe the service and support you received for the problem reported above or the DOA reported at left.

Who fixed your PC?
○ Manufacturer ○ Dealer/store where purchased ○ Manufacturer's authorized repair technician ○ Self ○ Other

What types of service and support did you receive? (Mark all that apply.)
○ Phone ○ On site ○ In store ○ System swap ○ Component swap ○ Factory return

If you received phone service, how long were you on hold?
○ Not at all ○ Less than 1 minute ○ 1–2 minutes ○ 3–5 minutes ○ 6–10 minutes ○ 11–20 minutes ○ More than 20 minutes

How long did it take before you talked to the person who finally helped you?
○ Less than 15 minutes ○ 15 minutes–1 hour ○ 2–5 hours ○ 6–10 hours ○ 11–24 hours ○ 1½–2 days ○ 3–5 days ○ 1 week or more

How long did it take to resolve the problem completely?
○ 1–2 days ○ 3–7 days ○ 8–14 days ○ 15–30 days ○ More than 1 month ○ Never resolved ○ Awaiting resolution

Was the problem resolved to your satisfaction?
○ Yes ○ No

How would you rate the person(s) who helped you?

	Poor		Good		Excellent
Courtesy	○	○	○	○	○
Knowledge	○	○	○	○	○
Follow-through	○	○	○	○	○

Based on the service and support you received, would you buy this brand of PC again?
○ Yes ○ No

On the whole, how satisfied are you with the service and support you received?
○ Not at all ○ ○ Satisfied ○ ○ Extremely satisfied

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Waiter, There's a Web Page in My Printer

Chip off the Old Block
TI's microLaser PowerPro/12 follows in the footsteps of the microLaser PowerPro, taking second place with fast performance and good PostScript output.

Suppose you crossed a printer with a Web page—what would you get? The Tektronix Phaser 550, a new color laser that uses an HTML-based utility called PhaserLink to communicate with a variety of computers on a network without installing platform-specific software. To check on the printer's status, just use your Web browser. It's a first for printers—or any hardware peripheral that we know of.

The Tektronix and the two other new color lasers we review this month, the HP Color LaserJet 5 and the QMS magicolor CX/32, have many strong points; however, they couldn't shake the triumvirate that continues to rule the color chart. HP's DeskJet 1600CM maintains the top spot. At arm's length, its output is almost indistinguishable in quality from competing lasers', yet it costs thousands of dollars less ($1999). The Apple Color LaserWriter 12/600 PS and the Lexmark Optra C are slower and more expensive than most other color lasers we've seen, but their output quality is the best of them all.

On our monochrome chart, the fast, capable Lexmark Optra R+ is still the Best Buy. But there's a new number two printer: Texas Instruments' 12-ppm microLaser PowerPro/12 takes up where its predecessor, the TI microLaser PowerPro (now discontinued), left off—with snappy performance and good output. We also looked at the 8-ppm version of this printer, the TI microLaser Pro/8.

A Family of Winners

With the same PC and Mac connectivity options but less RAM (3MB) than before and slightly less powerful processors, TI's $1439 microLaser PowerPro/12 and $1169 microLaser Pro/8 cost less than the old line they replace, and both gave us the same good laser

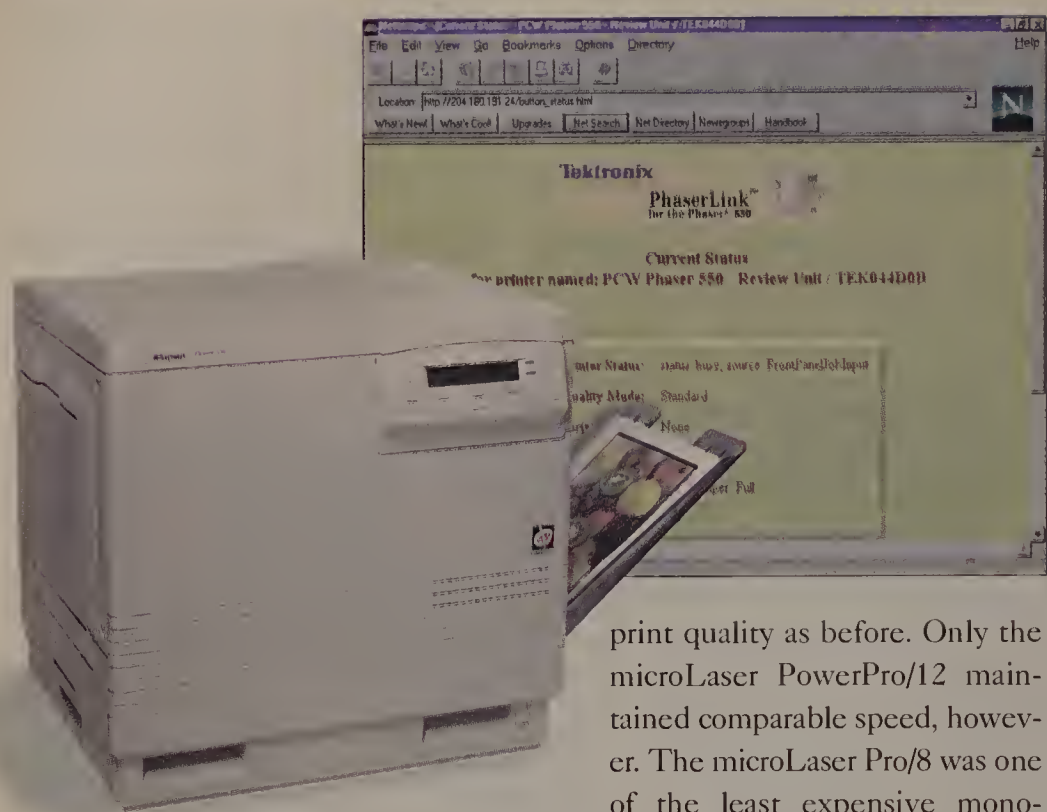
TOP 10 WORKGROUP PRINTERS

	Last ranking	First reviewed	Type	Street price	Overall rating	Output rating: Monochrome	Output rating: Color	Speed rating: Monochrome	Speed rating: Color	Features, ease-of-use rating	Reader service number	Comments
MONOCHROME												
1 Lexmark Optra R+ 800/891-0331	1	Mar 96	laser	$1450	89	78	–	86	–	82	631	Entry-level Optra is faster than predecessor.
2 TI microLaser PowerPro/12 800/848-3927	–	current	laser	$1439	84	75	–	77	–	68	632	Fast, compact PostScript printer debuts.
3 Lexmark Optra Lx+ 800/891-0331	2	Mar 96	laser	$2299	84	78	–	85	–	85	633	High-end Optra has more RAM and 500-sheet input.
4 Okidata OL1200 800/654-3282	4	Nov 95	laser	$1199	83	76	–	76	–	64	634	Inexpensive, comes with PostScript.
5 Brother HL-960 800/276-7746	5	Nov 95	laser	$999	82	73	–	49	–	72	635	Needs external networking device, lacks PostScript.
6 HP LaserJet 4MPlus 800/752-0900	6	Jan 96	laser	$1899	81	74	–	75	–	85	636	Network ready, 600 dpi, 12 ppm.
7 HP LaserJet 4MV 800/752-0900	7	Jan 96	laser	$2854	81	71	–	95	–	84	637	Network ready, 16 ppm, prints full-bleed 11 x 17.
COLOR												
1 HP DeskJet 1600CM 800/752-0900	1	Nov 95	ink jet	$1999	76	63	57	29	81	75	638	Low cost; good plain-paper printing. A winner.
2 Apple Color LaserWriter 12/600 PS 800/538-9696	2	Nov 95	laser	$6499	73	85	85	23	47	82	639	Very slow, but superior output. PostScript only.
3 Lexmark Optra C 800/891-0331	3	Mar 96	laser	$6400	73	85	85	30	30	78	640	Slowest color printer, but excellent output.

BEST BUY

Methodology To determine overall rating, we weight output quality and features (which includes hands-on testing) the most heavily, followed by price, support policies, performance, and consumables. For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 904.



Like a Web Page in a Printer
The Tektronix Phaser 550's Web-based PhaserLink interface can talk to any kind of computer at your company that has a Web browser, and mobile units can dial in, too.

print quality as before. Only the microLaser PowerPro/12 maintained comparable speed, however. The microLaser Pro/8 was one of the least expensive monochrome workgroup printers we've tested, but it was also one of the slowest, so it didn't make the chart.

Businesslike HP Color Laser

HP's new $5995 Color LaserJet 5 barely missed our chart. The colors, text, and gray scale it produced on pie charts and other common documents should suit HP's mainstream business audience. But output quality suffered on more complex graphics, and diagonal lines came out surprisingly jagged. HP's toner bottle refills save money compared to the self-contained cartridges you replace on most printers; just be patient as you empty the bottles into the printer's reusable cartridges so you don't spill the contents.

QMS's $6799 magicolor CX/32 is expensive, but it comes fully equipped with an internal hard disk, your choice of ethernet or Token Talk, and a husky 40-MHz CPU (25 MHz is more common) with 32MB of RAM (8 to 20MB is the usual range). While these enhancements don't do much for the magicolor CX/32's monochrome print speed, the unit wowed us by printing our full-page color photograph faster than any other printer we've tested—in a little over 2 minutes. And unlike many color lasers we've reviewed (including those currently on the chart), the CX/32 prints on envelopes. Unfortunately, the unit's output quality isn't quite as good as that of the Apple and Lexmark printers.

This is also why yet another attractive printer was kept off the chart. The $5945 Phaser 550, Tektronix's newest incarnation of its flagship color laser, gave us good text, line art, and gray-scale output at 600 dpi. It had rich color quality, but the textures on our test photograph looked flat. It comes with just 8MB of RAM (its predecessor came with 20MB), but if you add another 16MB of RAM (for an additional $1195), the Phaser 550 is capable of true 1200-by-1200-dpi print resolution.

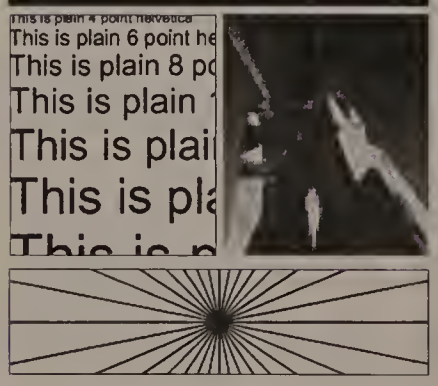
To test the Phaser 550's Web page–like PhaserLink network utility, we hooked our review unit into the Novell network at our office and sent it a print job. Then, in Netscape 2.0, we entered the printer's IP address just as you would enter a URL to dial in to a Web site. There we could see the printer's "busy" status and print settings. And we didn't have to load a separate network utility on our workstation.

—Bill Underwood

Bill Underwood specializes in printer design, evaluation, and manufacturing. Testing performed by Ulrike Diehlmann of the PC World Test Center.

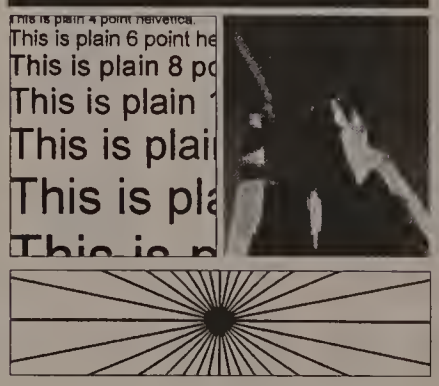
OUTPUT QUALITY SAMPLES Lexmark and New TI Differ on Gray Scale; HP Ink Jet Competes With Lasers

Lexmark Optra R+



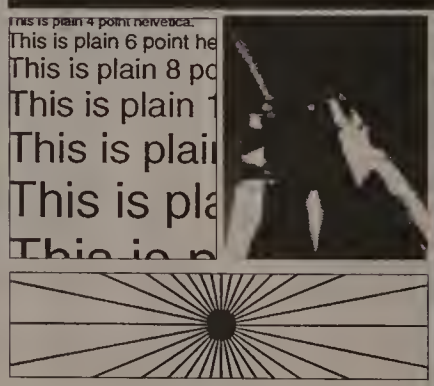
The Best Buy Optra R+ has superior print quality, with legible text down to 4-point size, crisp line art, and good gray scale.

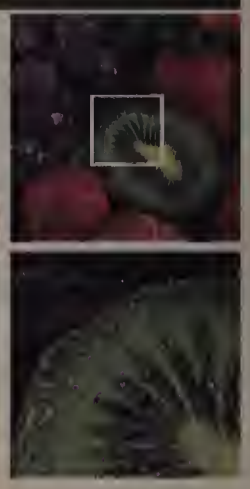
TI microLaser PowerPro/12



The new number two printer produces good text and line art but somewhat rougher gray-scale quality.

HP DeskJet 1600CM





This ink jet remains a Best Buy in part because its output—for most purposes—is nearly as good as a competing laser's.

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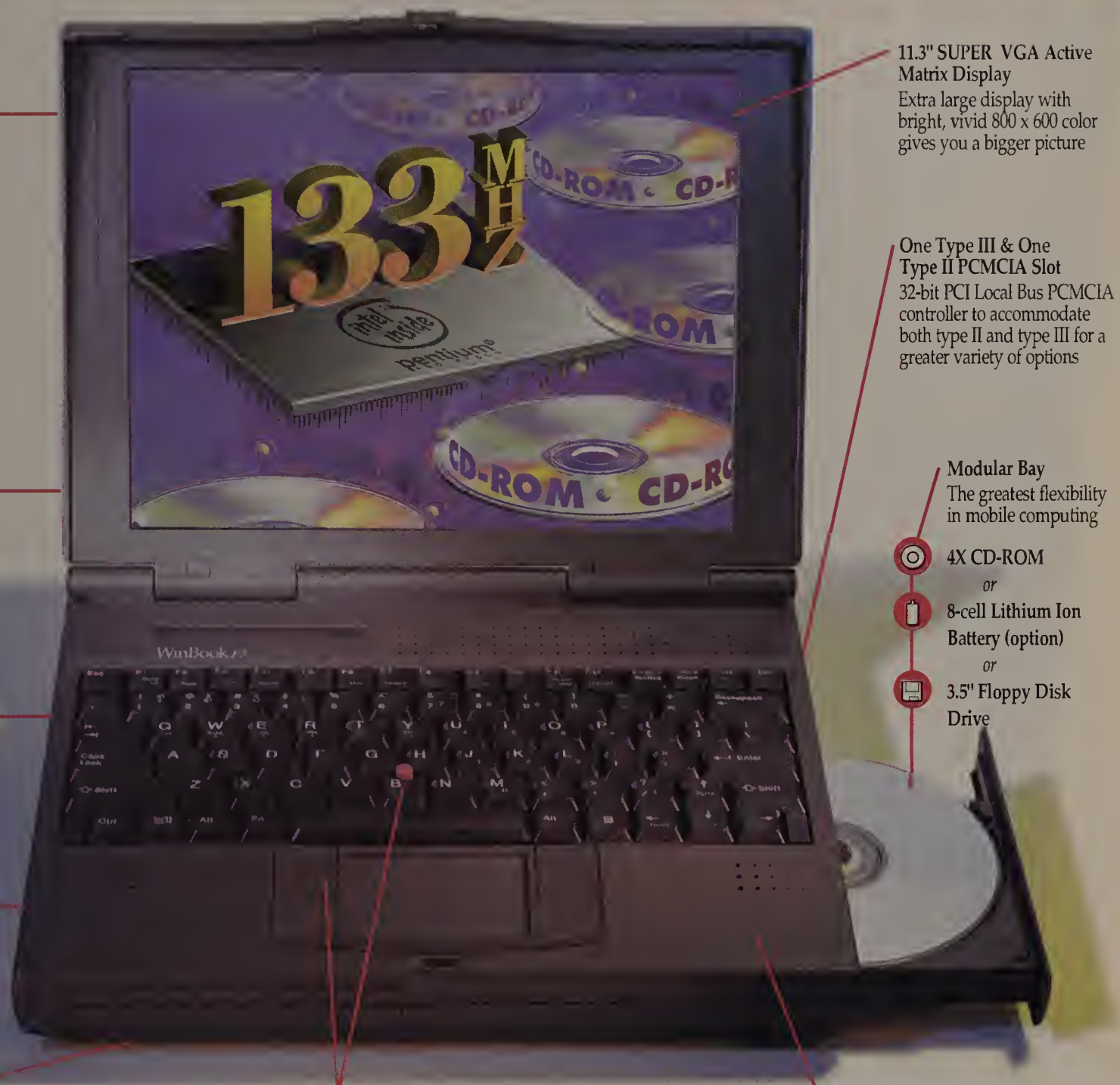

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New Big-Screen Best Buy: Samsung SyncMaster 20GLs

Big Screen, Small Ticket *Samsung's 20-inch SyncMaster 20GLs costs a modest $1269, but the low price doesn't compromise text and image quality.*

You've got a powerful new Pentium PC, a rapid-fire graphics card, and piles of fancy software. So why aren't you more productive? The answer may be right in front of your eyes. Viewing all those programs and documents simultaneously on screen without clutter or scrolling can be difficult—even on a 17-inch monitor. If you're ready to take the plunge and buy a really big monitor, check out our new Best Buy, Samsung's SyncMaster 20GLs, which debuts in second place on this month's chart. We expected some design compromises in a 20-inch monitor (18.75-inch actual viewable screen area) that costs only $1269—bad color quality or blurry text, at the least. We did have some problems deciphering the on-screen controls, but the screen looked much better than we expected. It displays small italic type, multiple rows of numbers, and color pictures with surprisingly good detail. Concerned about eyestrain? Paired with the right graphics card, the 20GLs can refresh at a rapid 100 Hz at 1024 by 768 or a respectable 77 Hz at 1280 by 1024.

The MAG MX21F costs $1700 (down $100 from our January review), which is several hundred dollars more than the 20GLs, but it's still our top monitor because of its superior display quality. Focused text and brilliant graphics make this big 21-inch monitor (with an actual viewable screen area of 19.15 inches) an excellent value.

Cornering the High End

Other than the Best Buy Samsung, only three new monitors we tested this month score high enough to earn places on our list. Edge to edge, the Cornerstone

TOP 10

19- TO 21-INCH MONITORS

	Last ranking	First reviewed	Street price	Overall rating	Text quality rating	Graphics quality rating	Features, ease-of-use rating	Dot or stripe pitch (mm)	Max. refresh rate at 1024 x 768 (Hz)	Reader service number	Comments
1 MAG MX21F 800/827-3998	1	Jan 96	$1700	85	83	85	65	dot 0.28	100	611	Excellent graphics and text display, high refresh; relatively small viewable area.
2 Samsung SyncMaster 20GLs 800/933-4110	—	current	$1269	85	75	75	59	dot 0.28	100	612	Bargain price, good display, high refresh; awkward on-screen control menu.
3 Compaq QVision 210 800/345-1518	2	Jan 96	$2099	84	85	80	71	dot 0.26	85	613	Great text quality, excellent graphics, Level 2b Plug and Play [1]; cumbersome on-screen menu.
4 NEC MultiSync XP21 800/632-4636	3	Jan 96	$2299	83	81	76	80	dot 0.28	76	614	Great text and graphics, Level 2b PnP, intuitive controls; expensive.
5 ViewSonic 21PS 800/888-8583	4	Jan 96	$1699	83	80	72	72	dot 0.25	104	615	Detailed text and graphics, fast refresh, Level 2b PnP; awkward control buttons.
6 CTX Multisync 2085 800/888-2012	5	Jan 96	$1229	83	69	72	60	dot 0.28	75	616	Low price, good graphics, Level 2b PnP, easy on-screen menu; standard refresh.
7 Mitsubishi Diamond Scan 20H 800/843-2515	6	Jan 96	$1551	83	62	67	83	stripe 0.28	106	617	Good price, high refresh, Level 2b PnP; so-so text quality, two faint lines on screen.
8 Cornerstone Color 21/88 800/562-2552	—	current	$2795	82	85	85	73	dot 0.27	107	618	Superb graphics and text, Level 2ab PnP, fast refresh, precise on-screen controls; expensive.
9 ViewSonic PT810 800/888-8583	—	current	$2195	82	71	84	77	stripe 0.3	113	619	Excellent graphics, high refresh, energy efficient; fussy on-screen control menu.
10 IBM P200 800/426-7255	—	current	$2149	82	84	75	69	stripe 0.31	115	—	Great for fine text, quality graphics, Level 2b PnP; two faint lines on screen.

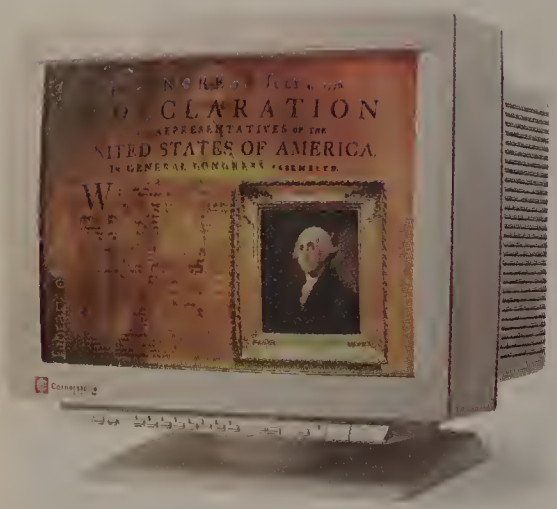
[1] Level 2b Plug and Play adds a bidirectional capability between graphics card and monitor; Level 2ab uses access bus to enhance synchronization and dialog between graphics components.

BEST BUY

Methodology We tested the monitors at a resolution of 1024 by 768 dpi, color depth of 65,536 colors, and a vertical refresh rate of 75 Hz. We used a Pentium-90 PC with 16MB of RAM and a Diamond Stealth64 PCI graphics card with 4MB of DRAM. The overall rating includes ratings for text and graphics quality (25 percent each), features and ease of use (25 percent), price (20 percent), and service and support (5 percent). For all ratings, higher is better. Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 902.

Color 21/88 has the best overall text and picture quality of all the monitors on the chart. So what's it doing buried in eighth place? At $2795, the 21/88 is the most expensive display we've tested yet. With a viewable screen area measuring 19.65 inches, this 21-inch monitor is designed particularly for people who use high-speed document management workstations or do precision CAD work. For $895 extra, Cornerstone bundles a PCI card that sharpens text legibility and color graphics on low-resolution scans so you can decipher tiny details on important documents. According to Cornerstone, this card for the Color 21/88 enables you to quickly flip through 20 scanned documents per minute, easing the task of sorting through volumes of documents (we did not test this feature). The Color 21/88 is equipped with a comprehensive selection of on-screen and push-button controls that make it easy to adjust the monitor with precision. To adjust, say, horizontal position, just press a button and an on-screen menu shows you the exact adjustment level. Submenus of more advanced options also allow you to tweak image geometry settings such as pincushion, image tilt, and barrel distortion.



Looking Sharp
Cornerstone's document-managing Color 21/88 has image quality that can't be beat, but this 21-inch behemoth costs a sky-high $2795.

Trying to view all your documents on screen can be difficult—even on a 17-inch display. A big monitor like one of these could help boost productivity.

Graphics look great on ViewSonic's PT810—colors are not oversaturated and flesh tones look particularly realistic—but the relatively high price ($2195) and so-so text quality score land this 21-inch monitor (19.2-inch viewable screen area) in ninth place. Small letters, particularly italics, are not quite as legible as the text on the other Top 10 screens we've tested. You can quickly fine-tune the display using a combination of front-panel control buttons and an on-screen menu, but we found the menu a tad rigid. The PT810 offers a full assortment of on-screen menu choices, but you have to hunt a bit when toggling to the control you want to adjust. For example, if you push the control button too many times while scrolling down, you have to return to the top and scroll to that menu option on the second pass.

Room With a View
The ViewSonic PT810 has a big footprint for a 21-inch monitor, but scanned photographs, full-page layouts, and intricate charts look great.

IBM's $2149 P200 brings up the rear in tenth place. If you spend a lot of time reading off a screen, you'll appreciate the great text display. The 6-point type in our spreadsheet and presentation tests was sharply focused and readable across the entire screen, achieved in spite of the Trinitron tube's notorious, faintly visible double lines. (The lines are caused by two fine wires inside the tube that hold the Trinitron's aperture grille in place. Most people, us included, find them easy to ignore after a while.) Scanned photographs also looked very good—bright and detailed—despite the monitor's large .31mm stripe pitch. Also noteworthy: The 20-inch P200 has an actual viewable area of 19.1 inches, is capable of high refresh rates, and sports easy-to-use buttons and on-screen controls that give you plenty of monitor adjustment options. Advanced controls—such as trapezoid, image tilt, and color convergence—are easy to locate, and it didn't take us long to perfect the image geometry, tilt the image to make it level, or fiddle with color balance.

Out of Sight

High prices or mediocre display quality keep the other four monitors we tested off our chart. The 21-inch Samsung SyncMaster 21GLs looked just as good to us as its sibling in second place, the 20-inch 20GLs. But an additional $800 is too much to pay for the added Level 2b Plug and Play support, faster refresh rates, and slightly larger viewable screen area of 19.3 inches.

The 20-inch IBM G200's use of a less expensive tube makes it more affordable ($1699) than its Trinitron-based P200 sibling in tenth place, but its viewable display area is a half-inch smaller, and display scores are predictably less impressive. Our staff of judges gave the G200 lower marks for fuzzy text near the edges of the screen, and slightly fogged color graphics. On the plus side, like the P200, the G200 got good marks for its comprehensive yet simple to adjust on-screen menu controls. We also looked at the 20-inch Apple MultipleScan 20 ($2149) and the 21-inch Philips Brilliance 21 ($2499). Both monitors offer just over 19 inches of viewable screen area and a full array of on-screen controls. Unfortunately, the combination of so-so display quality, high prices, and less intuitive control panel schemes keeps these two contenders off our chart.

For the next few months we'll concentrate the Top 10 monitor rankings on the more popular 15- and 17-inch markets and recap this list in the fall.

—John Goddard

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Drivers' Ed

CHAPTER 6:

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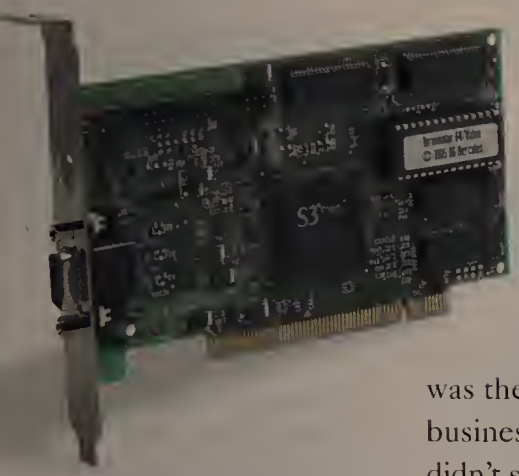
Terminator 64 Is Back With a Video Twist



Hercules Terminator Grows Up
The new Terminator 64/Video has all the features of a good video-enabled board for much less, but it's slow.

Last summer the Hercules Terminator 64 topped our chart, thanks to its fast Windows acceleration and sub-$200 price. This month the next-generation Terminator 64/Video claims the number eight spot with its combination of inexpensive EDO DRAM and full-motion video acceleration. In our tests, the $179 Terminator 64/Video was the slowest Top 10 board in both graphics and business applications, and its Windows 3.1 drivers didn't support the VESA standard 75-Hz refresh rate at 1024 by 768. For sheer value, though, the Terminator 64/Video is a good board, and it can accept low-cost MPEG playback and TV tuner daughtercards.

None of the other three boards we tested this month are Top 10 material. The $179 Genoa Phantom 64 V2001 comes close, but it was even slower than the Terminator 64/Video. To its credit, the Phantom 64 has a smooth, Windows-based installation and an intuitive software utility that uses a tabbed interface to organize video settings.

We also tested Reveal's new $199 SpeedCat Jaguar VC800, which proved especially easy to use. Its Plug and Play installation was flawless and its documentation easy to follow, but the board was slow, and it lacks the extra features, like video acceleration, that we see on most new boards today.

Colorgraphic's Mega Lightning is designed for people who use two monitors. This fast, ultra-high-end, $1295 board has two S3 Vision968 chips and 4MB of VRAM for driving two graphics systems. We understand its high price, which is reasonable for this type of board, but its poor install routine, sparse documentation, and weak utilities are major drawbacks.

TOP 10 GRAPHICS BOARDS

Last ranking		First reviewed	Street price	Overall rating	Performance ratings: Business applications	Performance ratings: Graphics applications	Max. refresh rate at 1024 x 768 (Hz)	Chip/installed RAM (MB)/type	Reader service number	Comments
1	Diamond Stealth64 Video 3200 800/468-5846	1	Sept 95	$269	84	80	85	120	S3 Vision968/ 2/VRAM	601	Fastest performance, good price for VRAM; no bundled apps.
2	STB Powergraph 64 Video 800/234-4334	2	Jan 96	$229	83	76	78	120	S3 Trio64V+/ 2/EDO DRAM	602	Delivers speed in business apps for less than VRAM cards.
3	Diamond Stealth64 Video 2201XL 800/468-5846	3	Nov 95	$233	81	72	85	100	S3 Trio64V+/ 2/EDO DRAM	603	Outstanding graphics speed for DRAM board, lots of software; no VL version.
4	Hercules Terminator Professional 800/532-0600	4	Jan 96	$279	81	78	81	120	S3 Vision968/ 2/VRAM	604	Fine overall performance, nice software utilities; poor install routine.
5	Matrox MGA Millennium 800/361-1408	5	July 95	$329	80	72	87	120	MGA-2064W/ 2/WRAM	605	Fast graphics; 3-D acceleration, great software bundle; no VL version.
6	VideoLogic GrafixStar 700 800/578-5644	6	Oct 95	$249	80	78	79	100	S3 Vision968/ 2/VRAM	606	Nonstandard VESA Media Channel for add-in cards, great VRAM price.
7	STB Velocity 64 Video 800/234-4334	7	July 95	$279	80	74	81	120	S3 Vision968/ 2/EDO VRAM	607	Better for graphics than no. 2 due to faster, more expensive EDO VRAM.
8	Hercules Terminator 64/Video 800/532-0600	—	current	$179	80	64	75	90	S3 Trio64V+/ 2/EDO DRAM	608	Slowest here, but among the least expensive; no VL version.
9	ATI Graphics Xpression 905/882-2600 ext. 1	8	Sept 94	$174	79	65	78	75	ATI Mach64/ 2/DRAM	609	Good value, but slow in business apps; poor video playback.
10	Number Nine 9FX Motion771 800/438-6463	9	July 95	$290	79	78	78	150	S3 Vision968/ 2/VRAM	610	Fast in business apps, high refresh rates, strong software utilities.

Windows Integrated Test Suite was developed by Jon Peddie Associates, a PC graphics consulting firm.

Windows 95–certified Plug and Play.

BEST BUY

Methodology We tested boards at 1024 by 768 resolution at 256 colors and at 800 by 600 resolution at 16.8 million colors. The business applications rating consists of WITS scores for Word 2.0 for Windows, Excel 4.0, and Freelance Graphics 2.01 running in 8-bit mode, and for Freelance running in 24-bit mode. The graphics applications rating consists of WITS scores for CorelDraw 3.0, PhotoStyler 1.1, and QuarkXPress 3.11 running in both 8-bit and 24-bit modes. The overall rating includes ratings for performance (40 percent), features (30 percent), price (20 percent), and support (10 percent). For all ratings, higher is better.

For more information about all products in this table, circle reader service no. 901.

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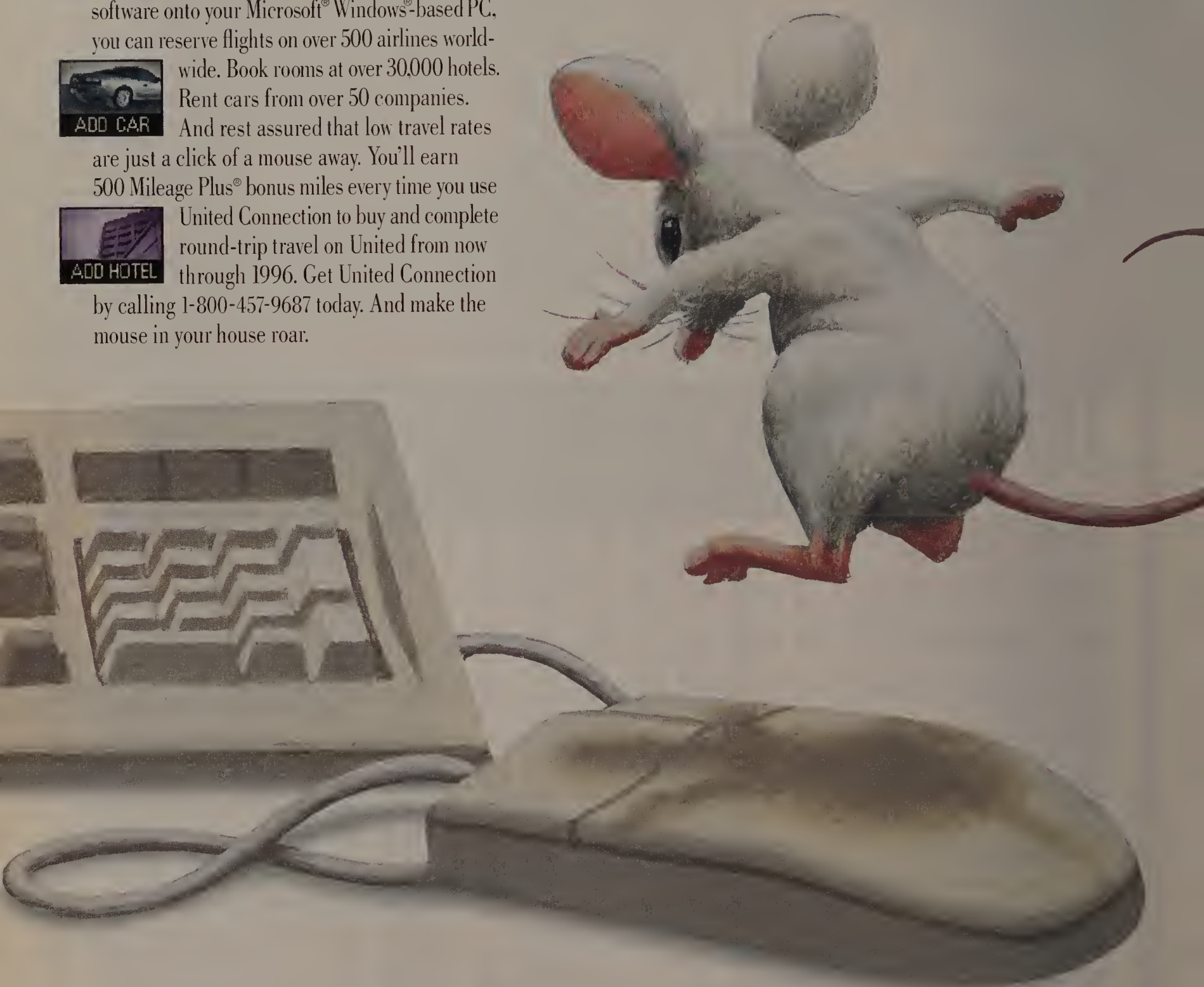

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Cardinal's Voice Modem: Talk Is Cheap

Voice Modem for the Masses: ***Cardinal's $209 modem lets your PC serve as an answering machine, and it lets you alternate between voice and data during a call.***

The sole addition to our chart this month is Cardinal's MVP288XV external modem. For its low $209 price it has a great feature set, most notably its voice-mail abilities, MNP-10EC cellular protocol, and Flash ROM for easy upgrading. Only mediocre performance kept the MVP288XV low on the list.

Microcom's DeskPorte 28.8P and Motorola's ISG Lifestyle 28.8 remain our external modem Best Buys, mostly due to their excellent performance and competitive prices. We took a look at three external modems we've tested previously, this time with updated firmware, but none made the chart. In all respects the BocaModem MV V.34 is solid—but not outstanding. MultiTech's $189 2834ZDX has good throughput and connected at 28.8 kbps more than three-quarters of the time. But it has a meager feature set—you don't find cellular support, Flash ROM upgradability, or security features. Price is competitive and performance acceptable in the $199 Hayes Accura 288, but it too has only the basics.

Zoom's V.34C modem is now in its third month as a PC Card Best Buy—it's still the fastest and cheapest in our roundup. None of the new PC Cards we tested landed on the chart. TDK's DF2814 nearly made it, thanks to stellar performance, toll-free support, a friendly $270 price, and goodies such as Flash ROM and MNP-10. A difficult Windows 95 installation held it back, though. TDK's DF2814 Global Class is pricey at $399, but it allows you to optimize your modem setup—using the included set of phone line connectors—in a variety of countries. Piiceon's Dispatcher 28.8 is solid but does not excel in any area. Boca's MV.34PC is very affordable, but apart from MNP-10, extras are few.

TOP 10 MODEMS

	Last ranking	First reviewed	Street price external/internal (ISA)	Overall rating	Throughput rating	Connect rating	Features, ease-of-use rating	Reader service number	Comments
DESKTOP MODEMS									
1 Microcom DeskPorte 28.8P 800/822-8224	1	Apr 96	$215 / —	89	78	90	79	621	Reasonably fast, easy on your budget, toll-free support, serial and parallel port connections.
2 Motorola ISG Lifestyle 28.8 800/566-3266	2	Mar 96	$200 / $175	89	85	97	69	622	Basic features, but nice price and toll-free support.
3 U.S. Robotics Sportster V.34 Faxmodem 800/342-5877	3	Nov 95	$219 / $199	88	83	90	78	623	Excellent performance, affordable; manual volume control, but otherwise sparse features.
4 Cardinal Technologies MVP288XV 800/775-0899	—	current	$209 / —	87	75	82	81	624	Performance is so-so, but you get voice mail, VoiceView, and cellular support.
5 Microcom DeskPorte Fast V.34 800/822-8224	4	Nov 95	$391 / —	86	75	90	88	625	Not cheap, but very easy to use. Plain-language display, toll-free tech support.
PC CARD MODEMS									
1 Zoom V.34C Model 520 800/631-3116	1	Mar 96	$199	88	74	90	77	626	Installation likely to require support call, but best price and performance on PC Card chart.
2 Microcom TravelCard 28.8P 800/822-8224	2	Feb 96	$274	87	77	80	78	627	Excellent performer comes with toll-free support.
3 MultiTech Systems MultiModem LT 800/328-9717	3	Apr 96	$249	86	68	87	74	628	Alluring price on true Plug and Play unit. High connect reliability, too.
4 Megahertz XJ2288 800/527-8677	4	Feb 96	$309	85	76	69	85	629	Comes with excellent documentation, pop-out phone jack. Great for technophobes.
5 Hayes Optima 288 V.34+Fax for PCMCIA With EZjack 770/840-9200	5	Feb 96	$269	84	79	72	77	630	Low connect rate at 28.8, but affordable. Now detects calling card tone.

BEST BUY

Methodology We tested each modem using a pair of identical units, one at each end of a simulated public-service telephone network from Telecom Analysis Systems. We tested throughput and connect rates using a variety of file types and line conditions outlined in the Telecommunications Industry Association's TSB-37A and 38 specifications. We used vendor-supplied initialization strings. The more expensive a modem, the more importance we give price in the unit's overall rating. The overall rating includes ratings for price (3 to 20 percent), features and ease of use (32 to 38 percent), performance (40 to 46 percent), and support (8 to 13 percent). Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

For more information about all products in this table, circle reader service no. 903.

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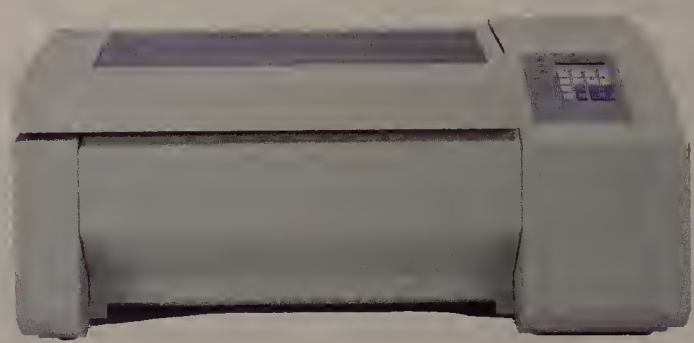

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November 7, 1995
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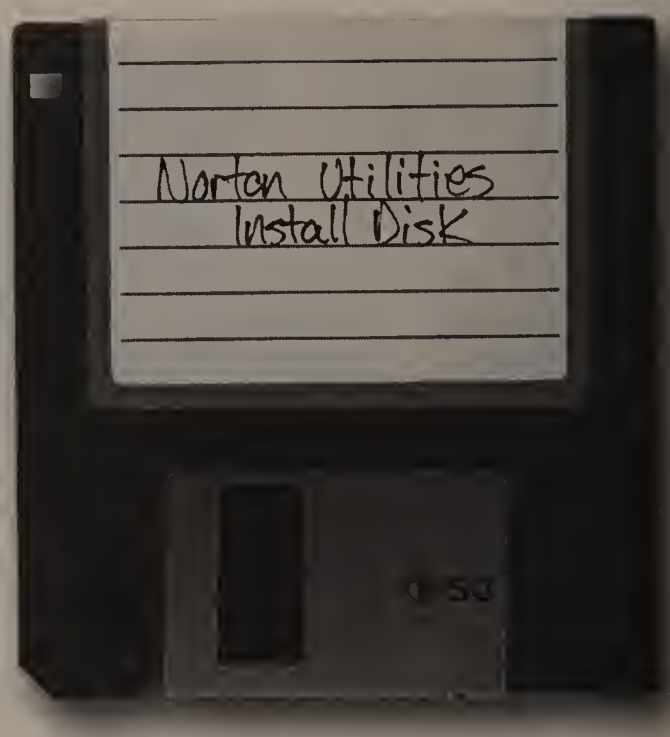

These disks are exactly the same, but somebody just paid $100,000 for the one on the right.

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Here's How

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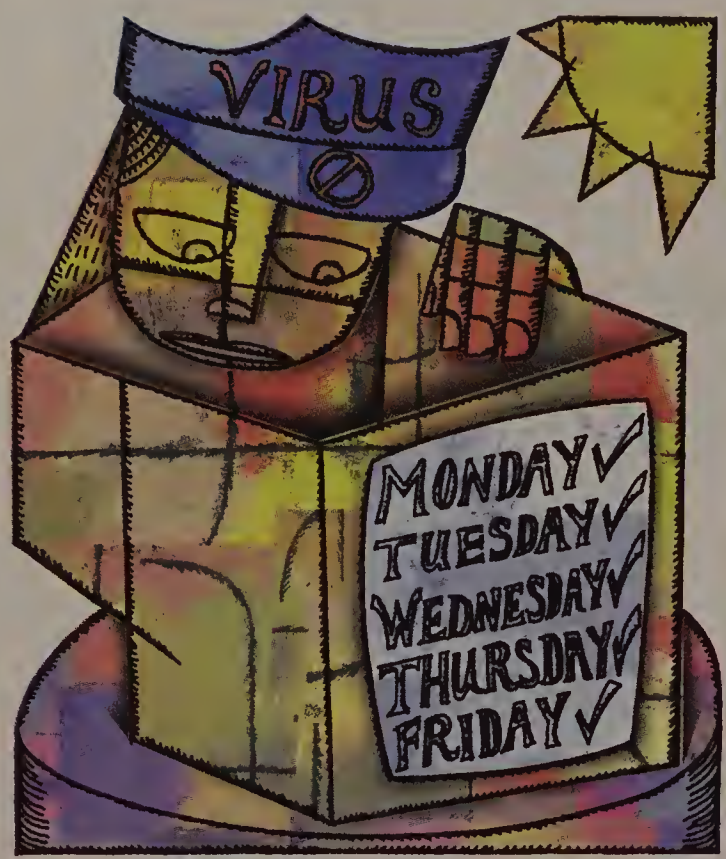
HELP LINE Q&A



One Virus Scan Per Day Is Plenty

Q Recently, the information service people in my company have gone berserk over the threat of computer viruses on the network. They insist that everyone run antivirus scanning software every day, and the way they've implemented this is to launch the program from the autoexec.bat file. Unfortunately, they also insist on having the program check every file.

This process is tedious enough to endure once each day, but if your computing experience is like mine, a day without at least one reboot is a rarity. Are there some commands I could add to autoexec.bat that check to see if the file has already been processed once that day?

Stan Mitchell, Rex, Georgia

A Your coffee consumption must be going through the roof. Still, your IS gurus probably have good reason for the heightened virus scanning. Despite the availability of excellent antivirus software, traditional executable file and boot-sector infectors are alive and well, abetted by a new crop of viruses transmitted via documents, e-mail, and the Internet. You're being a good "netizen" by not disabling the antivirus software or limiting the scope of its search.

The commands in **FIGURE 1** should do what you want and keep the IS folks happy. Just add these lines to your autoexec.bat file, replacing the line 'rem (antivirus program commands go here)' with the lines that currently launch your antivirus program. The autoexec.bat file will scan your hard disk for viruses only the first time it runs.

Put That Fax Machine to Work, and Put Your Wallet Away

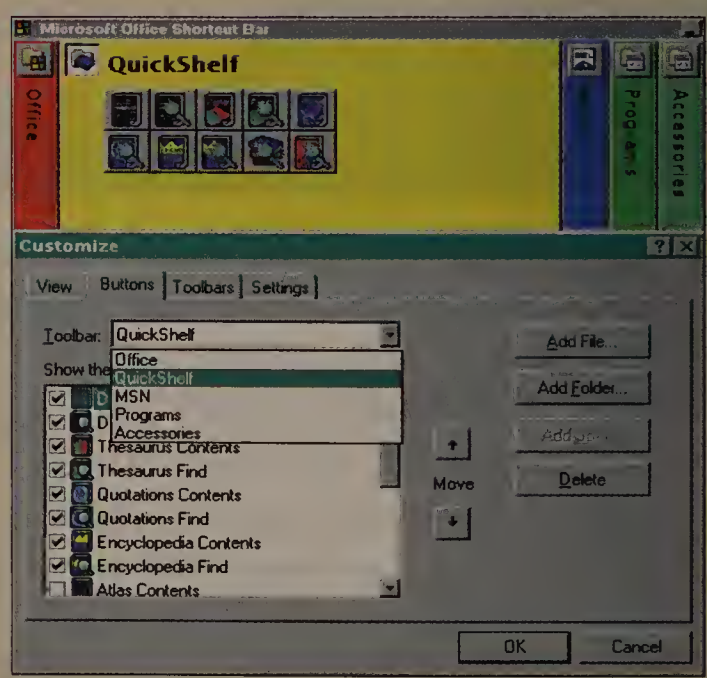
In the January issue, you advised a reader who wanted to scan and print using his fax machine to buy the Scan-By-Fax interface product ["Put That Fax Machine to Work"]. While this device is no doubt a convenience, I've been doing the same thing for years using nothing but a phone cable between the fax machine and my computer's fax-modem. Both are (and must be) connected to a single phone line.

Customize Office 95's Shortcut Bar for Faster Access to Your Work

One of the best but least-appreciated features of Microsoft Office 95 is the Shortcut Bar, which can be customized in a number of ways. Just right-click in a blank area of the Shortcut Bar and select Customize from the resulting menu to add or remove applications, enlarge their icons, or add up to eight toolbars, including ones for Accessories, the Microsoft Network, and the QuickShelf applications that come with Microsoft's Bookshelf.

You can place the Shortcut Bar anywhere on the screen, and you can auto-hide it whenever you start an application. I keep mine on the left side of the screen. It doesn't obscure anything because when programs maximize, they adjust so that they don't overlap with toolbars. My Shortcut Bar includes a copy of each application I have on my desktop, plus Explorer, File Manager, and the Control Panel.

Jason Dulnev, Baltimore



RICHARD DOWNS

```
@echo off
echo.|date>today.txt
fc /l today.txt lastboot.txt|find "no" >nul
if not errorlevel 1 goto skip
echo Running antivirus program
rem (antivirus program commands go here)
goto end
:skip
echo Skipping virus search
:end
echo.|date>lastboot.txt
```

FIGURE 1: SCAN FOR VIRUSES ONCE (and only once) per day by adding this code to autoexec.bat.

To scan a document, I place the page in the fax machine, lift its receiver, and press any digit on its keypad. This clears the dial tone and prevents any incoming calls. To send the document to the computer, I simultaneously press the send button on the fax machine and select the manual receive command in my fax program on my PC.

To print I simply reverse the process: I dial a single digit in my fax program's manual dial window, then tell it to send the document. I then pick up the fax machine's handset and press Start.

Christopher Kessell,
Castries, St. Lucia, West Indies

Editor's note: If (like me) you're a tightwad and hate a desktop cluttered with gadgets, this cool tip is the way to go. But if you want single-click convenience, Scan-By-Fax is worthwhile.

- **Scan-By-Fax** about $100 through mail order suppliers; Infinity Computer Products, Inc.; 800/275-7227, 610/539-9494
  Reader service no. 675

Flying Windows 95

Q In a past issue of *PC World* someone submitted a tip for changing the Windows logo in the Flying Windows screen saver to any other symbol. The only thing I remember from the tip is that the screen saver gets the Windows logo by looking at the last character of the Wingdings font, and that by replacing that character with another one (even another character in the same font) you can come up with a very different screen saver.

Are there any shareware programs that let you manipulate the characters in a font? And does the tip work under Windows 95? I'd love to modify this screen saver, but I'm not ready to shell out big dollars for a font editor.

Raunak Desai,
Roselle Park, New Jersey

A The tip, published in the May 1995 *Star-Dot-Star* ("Fly out a Different Window"), works fine under Windows 95. But to my knowledge, there's no such thing as a shareware or public-domain font editor.

Last year's tip suggested using CorelDraw's font-manipulation skills to replace the Windows logo in the Flying Windows screen saver, and that advice still holds. Here's a recap:

1. Back up the Wingdings font file wingding.ttf.

2. Create a new character in CorelDraw, or select a different character from Wingdings or another font file (see **FIGURE 2** on the next page).

3. Export your new character to wingding.ttf and assign it character number 255.

For more complete instructions, search CorelDraw's help system for *fonts: creating*, then *creating Adobe Type 1 & TrueType fonts.*

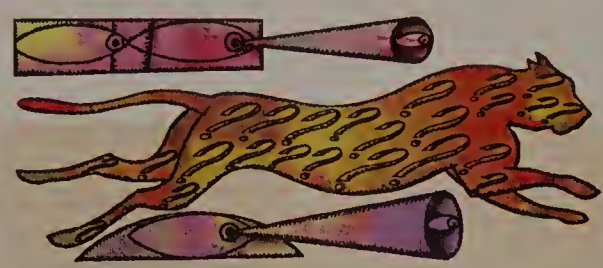


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FIGURE 2: REPLACE THE LOGO in the Flying Windows screen saver with your own character.

The latest version of CorelDraw is 6.0, but you can still buy version 3.0 for as little as $50 from mail-order houses. If that's too much to spend on a one-time tweak, ask a friend or coworker who uses CorelDraw if you can borrow his or her computer for a few minutes.

You can also use a more costly font editor to change the last character of the Wingdings font, but if you own a copy of one of those and know how to use it, you probably didn't read this far.

Quelling QuickTime File Association

Q I use both QuickTime and MPEG digital video viewers (because both types of files are on the Internet), and in and of themselves they work great. For .mpg files I use Vmpeg 1.7, and for .mov files I use Apple's QuickTime for Windows 2.03—the latest version I could find on the Internet.

Unfortunately, if I view a QuickTime clip with QuickTime's Player, MPEG clips mysteriously become associated with the QuickTime program, rather than with Vmpeg. The opposite is also true: If I reassociate .mpg files with Vmpeg, .mov files become associated with that program. Since Player doesn't know what to do with MPEG clips, and Vmpeg is incapable of playing QuickTime movies, what should I do?
Russell Harris, Overland, Missouri

A The blame falls on the otherwise excellent (and free) QuickTime for Windows, which claims both the .mov and .mpg extensions as its own. The simplest way around the problem is to rename your MPEG clips with another Vmpeg-compatible file name extension, such as .m1v. But that won't help if your MPEG files are on a CD-ROM or an Internet server. To convince Windows that .mov and .mpg files are different breeds, you'll have to do a little Windows Registry editing.

But first, rename an .mpg file on your hard disk with the .m1v extension. It doesn't even have to be an MPEG clip; a dummy file will do. Then associate it with the Vmpeg player in the Windows Explorer: Select *View•Options*, click the *File Types* tab, and click the *New Type* button. In the Add New File Type dialog box, enter **MPEG video** in the 'Description of type' field, enter **m1v** in the 'Associated extension' field, and click *New*. In the New Action dialog box, enter **open** in the 'Action' field, and enter the path to the MPEG player in the 'Application used to perform action' field. Close all the dialog boxes.

Before you edit the Registry, make backup copies of the following files in the Windows folder: user.dat, user.da0, system.dat, system.da0. (If you don't see these files, choose *View•Options* in My Computer or Explorer, click the *View* tab, select *Show all files*, and click *OK*.) Start the Registry Editor by selecting *Start•Run* and entering **regedit**. Click *HKEY_CLASSES_ROOT\.m1v* in the left-hand pane, double-click *(Default)* in the right-hand pane, press **<Ctrl>-C** to copy the Value data field to the Clipboard, then click *Cancel*. Next, click *HKEY_CLASSES_ROOT\.mpg*, double-click *(Default)*, and press **<Ctrl>-V** to replace the QuickTime FramePlayerClass string with the MPEG-related string copied from the m1v key.

Exit the Registry Editor and restart Windows. Your .mpg files should now be associated with Vmpeg and your .mov files should be associated with QuickTime. Be sure not to use Explorer to associate either file type with a viewer, though. Despite your Registry handiwork, associating one file type with a particular viewer will still associate the other type as well.

Corrections to Adding a Second Hard Disk

Judging from the number of responses to "How to Add a Second Hard Disk in Windows 95" (February), installing a new hard disk as drive C: is something almost everybody wants to do. Unfortunately, I left out some important information in steps 7 and 9, which several alert readers noticed.

Step 7 instructs you to disable virtual memory before copying the contents of the old drive to the new one. If you don't do this, xcopy will fail when it encounters the virtual memory swap file, win386.swp. If you have 12MB of memory or more installed, no problem. If you have less than that, you'll find the Disable virtual memory check box grayed out.

To make the tip work on a system with less than 12MB of memory, move the swap file to the new drive instead of disabling it. To do so, follow the steps as printed in February up to the point where you're instructed to select the Disable virtual memory check box; select another drive from the Hard disk list instead. Click *OK*, *Yes*, *Close*, and *Yes*, then restart Windows.

In step 9, I left out an important parameter in the xcopy command. If you try to copy the contents of your existing hard disk to the new (and nearly empty) drive, you'll get an Access Denied error when xcopy encounters the read-only msdos.sys file copied there in step 4. If you know your way around xcopy, you probably figured out that you need to add the /r parameter to allow xcopy to overwrite read-only files. The xcopy command should read **xcopy c:*.* /e /h /k /r** *d:*, where *d* is the drive letter of the new hard disk.

I apologize for any inconvenience these errors may have caused.

By Scott Spanbauer

Scott Spanbauer is a contributing editor for PC World *and a coauthor of* The PC Bible, Second Edition *(Peachpit Press, 1995, 800/283-9444).* Help Line *welcomes your questions and tips, and pays $50 for published items. See page 14 for contact information.*

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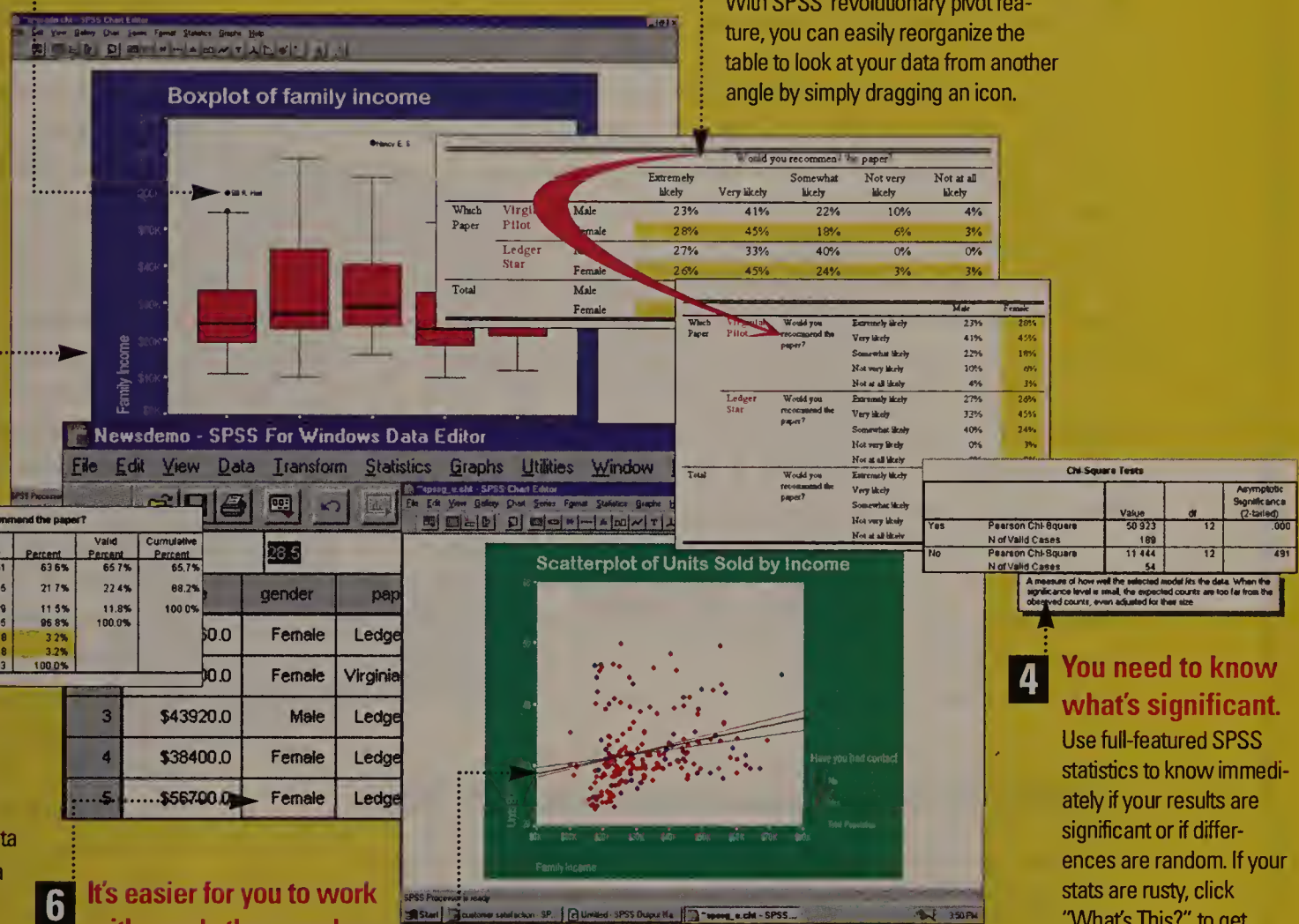

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SPREADSHEETS Q & A

Automating Subtotals With Data Table Commands in Any Spreadsheet

Q I'm using Excel to store lists of evaluation data that I need to summarize according to training teams. At first I thought Excel's subtotal feature would be perfect for this, but I'm finding it's a pain in the neck. Every month I have to insert the subtotals (they're actually averages), format them, print the report, then remove the subtotals before I add more data or sort the list for a different report.

Can I set up a subtotals report that I don't have to re-create every month?

Sandy Jernigan,
Monks Corner, South Carolina

A There are several solutions to this standard problem of summarizing spreadsheet data in groups. You could use Excel's pivot tables, but the slickest method is an old trick that uses the Data Table feature, a part of every major spreadsheet since 1-2-3 release 1A, in conjunction with the database average function—daverage in Excel, and @davg in 1-2-3 and Quattro Pro.

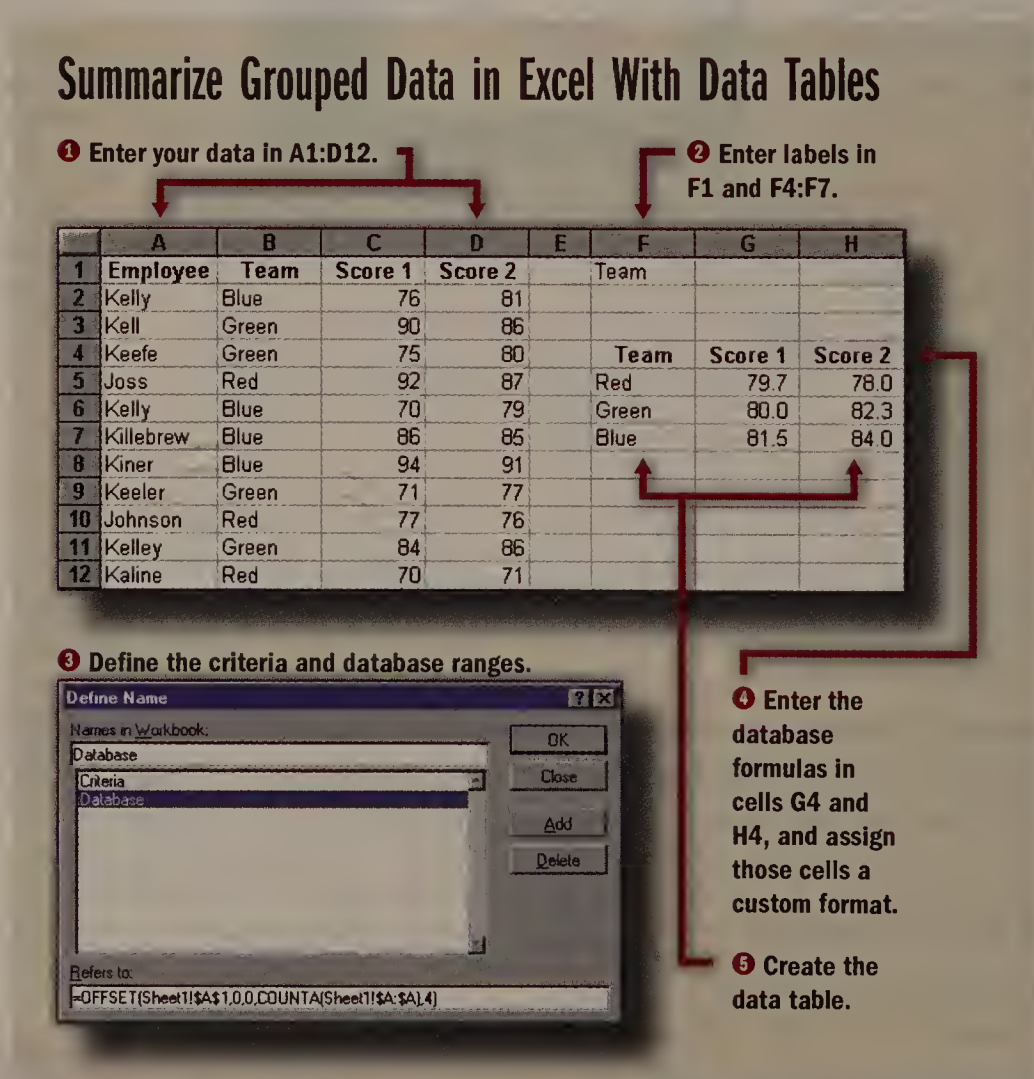
A data table shows how the results of one or more formulas are affected by the changing values of an input cell. When the input cell is the criteria cell of a database function (that is, when it restricts the formula to certain records), each result summarizes a different subset of the data. In Excel, the data table is an array formula that is recalculated dynamically as the data changes. In 1-2-3 and Quattro Pro, you must issue a command to recalculate the data table.

To build the Excel model, which has several refinements unique to Excel, follow the steps outlined here and illustrated in **FIGURE 1**.

1. Enter your data in range A1:D12.
2. Enter the labels for the input cell (F1), and for the data table (F4:F7).
3. Use the *Insert•Name•Define* command to define the criteria range, **F1:F2**, and the database range, **=offset(A1,0,0, counta($A:$A),4)**. This offset formula makes the Database range dynamic so that it expands to include any new data appended to the bottom of the range.
4. In cell G4, enter **=daverage(database, "Score 1",criteria)**, and in cell H4, enter **=daverage(database,"Score 2",criteria)**. Assign cell G4 a custom format that replaces the formula result with the label 'Score 1': Select G4, select *Format•Cells*, choose *Custom*, type **"Score 1"** (including the quotation marks), and click *OK*. Repeat these steps for cell H4.
5. Create the data table: Select range F4:H7, select *Data•Table*, specify **F2** as the Column Input Cell, and click *OK*.

The formula in G4 calculates the average of the values in column C that match the criteria in F2. The formula in H4 does the same for column D. The data table (F4:H7) uses the values in F5:F7 as alternative inputs for F2; thus, the values in G5:G7 represent the Score 1 averages for the three teams, and the values in H5:H7 represent the Score 2 averages for those teams.

In Quattro Pro, the dynamic range name trick won't work, so assign the name **database** to range A1..D12. In cell G4, enter the formula **@davg(database,2, criteria)**, where 2 represents the offset number of the Score 1 column, or column C. In cell H4, enter the formula **@davg(database,3,criteria)**, where 3 is the offset number of the Score 2 column, or column D. To format a cell so that it displays the label 'Score 1' or 'Score 2', right-click the cell and select *Block Properties*. Select the *Numeric Format* tab, click *User Defined*, and in the Formats Defined box, enter **T'Score 1'** or **T'Score 2'**, including the single quotes. To create the data table, select range F4:H7, and then select *Tools•Numeric*



	A	B	C	D	E	F	G	H
1	Employee	Team	Score 1	Score 2		Team		
2	Kelly	Blue	76	81				
3	Kell	Green	90	86				
4	Keefe	Green	75	80		Team	Score 1	Score 2
5	Joss	Red	92	87		Red	79.7	78.0
6	Kelly	Blue	70	79		Green	80.0	82.3
7	Killebrew	Blue	86	85		Blue	81.5	84.0
8	Kiner	Blue	94	91				
9	Keeler	Green	71	77				
10	Johnson	Red	77	76				
11	Kelley	Green	84	86				
12	Kaline	Red	70	71				

FIGURE 1: COMBINE A DATA TABLE WITH THE DAVERAGE FUNCTION to summarize grouped data. This Excel model can be adapted for any spreadsheet.

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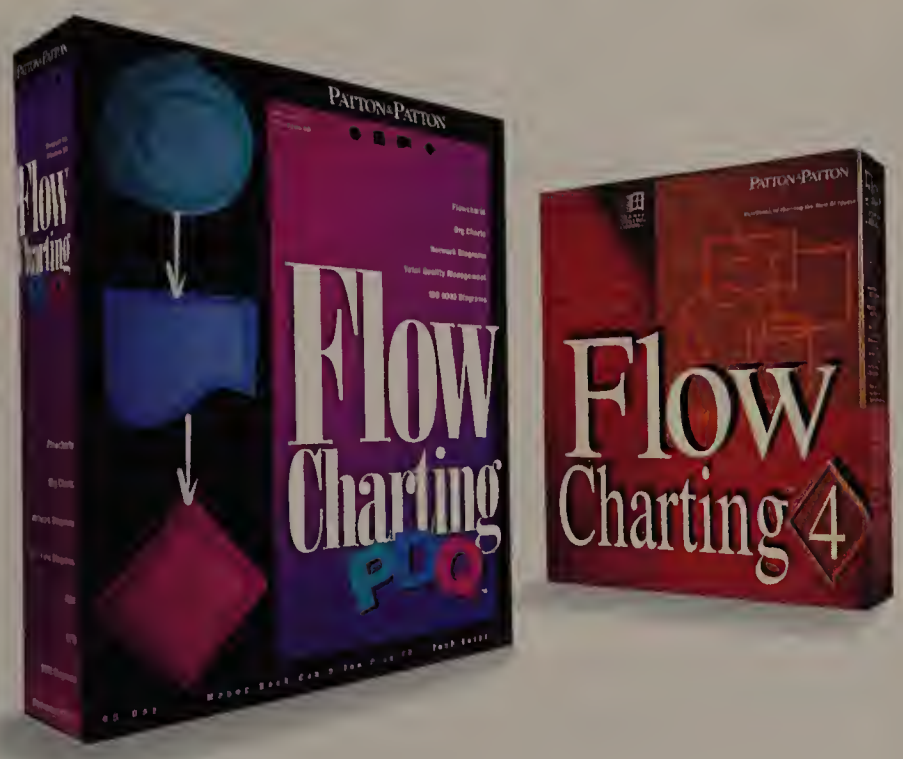

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Tools • What-If. Specify **F2** as the Input Cell, click *Generate*, then click *Close.*

In 1-2-3, assign the name **database** to A1..D12. In cell G4, enter **@davg(database, "Score 1",criteria)**. In cell H4, enter **@davg(database,"Score 2",criteria)**. To create the data table, select F4..H7, then *Range • Analyze • What-if Table.* Specify the number of variables as *1*, specify *F2* as Input Cell 1, and click *OK.*

Control Excel's Cell Pointer During Data Entry

Q My brother and I bought a computer together, and on his recommendation I switched from 1-2-3 to Excel 95. Whenever I press <Enter> to put something in a cell, the pointer moves down to the next cell. This is driving me nuts! My brother loves this feature, but I hate it. How do I turn it off?
Tyrone Poussaint,
Baton Rouge, Louisiana

A Good question! Another reader, Chuck Pasek of Parsons, Kansas, has a solution: Select *Tools • Options,* click the *Edit* tab, and uncheck 'Move Selection after Enter'.

If you don't want to turn off the feature permanently, you can temporarily override it by pressing **<Ctrl>-<Enter>**. (Warning: If you have preselected a range, this keystroke copies your entry into all selected cells.)

Because you're running Windows 95, you and your brother can each have it your own way. From the Taskbar select *Start • Settings • Control Panel,* double-click the *Passwords* icon, then select the *User Profiles* tab. Select the button that begins *Users can customize their preferences,* and click *OK.* Now, each time you start Windows, you'll be prompted for a user ID and password. You and your brother can each create your own Windows 95 setup. And since Excel 95 is designed to run under Windows 95, you can each customize Excel by selecting *Tools • Options.* Whenever you start Excel, the preferences you specify become the defaults.

A B C Macros

D	A	B
1	\p	{onerror \p_err}
2		{file-unseal "password"}
3		{select A:A1}
4		{windowsoff}
5		{show-sheets B:A1..C:A1}
6		{select firstrange}
7		{select-append secondrange}
8		{print selection}
9	\p_err	{hide-sheets B:A1..C:A1}
10		{file-seal "password"}
11		{select A:A1}

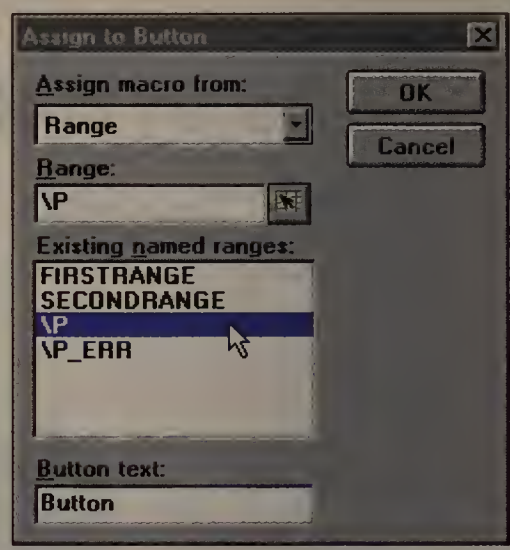
FIGURE 2: PRINT DATA FROM HIDDEN SHEETS with this simple 1-2-3 macro.

Printing Hidden Sheets in 1-2-3

Q I have a 1-2-3 file with three sheets. To keep users from messing around with the formulas or data, I keep two of the sheets hidden and seal the file with a password for good measure. But alas, I've found I must unhide the sheets before I can print reports that are located on them. Is there some way to print from the hidden sheets?
John Poweska, Lorain, Ohio

A There's no way to print a report from a hidden sheet in 1-2-3, so I wrote the macro in **FIGURE 2** (available as 5hss2.wk4 on PC World Online) to do the job. The macro unseals the file, unhides the hidden sheets, and prints a range from each one. Then it hides the sheets and reseals the file. It also has an error-trapping feature that reestablishes security in case of an error. The macro should be placed on a hidden sheet to conceal the password from users.

To see how it works, create a file with four worksheets. Double-click the sheet D tab and name it **Macros**. Then enter the statements shown in Figure 2. With the *Range • Name* command, assign the name **\p** to cell B1, and the name **\p_err** to cell B9. On sheet B, create the name **firstrange**; on sheet C, create the name **secondrange**. Go to sheet A, and click the button tool to create a macro button. In the Assign to Button dialog box, shown above, select *Range* in the 'Assign macro from' list, and choose *\P* in the 'Existing named ranges' list. Change the button text if you wish, then click *OK.*



To run the macro, go to sheet A and click the button, or press **<Ctrl>-P**. Once you're sure the macro works, go to the macros page, select *Style • Hide,* click *Sheet,* then click *OK* to hide the sheet.

Here's how it works:

{onerror \p_err} causes the macro to resume at B9 if it causes an error or if the user presses <Ctrl>-<Break> while the macro is running, thus rehiding the confidential data.

{file-unseal "password"} unprotects the file so that the macro can unhide and print the sheets. Substitute your own password for the one used here.

{select A:A1} brings sheet A into view if it wasn't visible already.

{windowsoff} conceals the remaining macro activity from the user's view.

{show-sheets B:A1..C:A1} unhides the sheets to be printed.

{select firstrange} selects the first range to be printed, from sheet B.

{select-append secondrange} adds the second print range to the selection.

{print selection} prints the two ranges.

{hide-sheets B:A1..C:A1} rehides the confidential sheets.

{file-seal "password"} reseals the file, using the same password as above.

{select A:A1} displays sheet A.

By Richard Scoville

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WORD PROCESSING Q&A

Creating Ruled Paper in WinWord

Q My children are forever asking me for lined paper to use for writing practice, but it seems like there's never any in the house. Is there a way I can create a blank document in Word 6.0 with horizontal lines? Your answer will help bring peace to my home office.
Kenneth Shapiro, Microsoft Network

A Interesting question! There are several answers, but I'll give you the easiest. Just follow the steps listed below and shown in **FIGURE 1** in either WinWord 6.0 or Word for Windows 95.

1. In a new, blank document, select *File•Page Setup*, change all four margins to 0.5 inch, then click *OK*.

2. Select *Format•Borders and Shading*. In the resulting dialog box, click the center horizontal line area of the Border frame example to insert a line. Select a line style from the Style frame, or leave it at the default setting of *3/4 pt*, and click *OK*.

3. Click the *Font Size* drop-down list and choose a larger than normal font size. There are 72 points per inch, so if you want the lines to be spaced about 3/8 inch apart, choose *24* points.

4. Press **<Enter>** to add lines until the page indicator in the status bar shows that you've reached page 2. Then press **<Backspace>** until you return to page 1.

5. Print a test sheet to check your dimensions. If you need to adjust spacing, select *Edit•Select All* and change the font size. Add or delete lines to fit the page, if necessary. When you're satisfied, save the document with a distinctive file name, print as many copies as your kids need, and remind them to dot their *i*'s and cross their *t*'s.

Automatically Place File Name in WinWord 95 Footer

Q How do I get WinWord 95 to automatically insert the current file name in a document's footer? I know how to do this manually, but I'd like to make this automatic for all documents.
Arcadio Ramirez, America Online

A Not a problem. All you do is add the footer and file name code to your normal.dot template in WinWord. To do this, select *File•Open*. In the Open dialog box, choose *Document Templates (*.dot)* in the 'Files of type' list. Switch to the templates subdirectory of the msoffice directory (or to the template directory of the winword directory if you aren't using Microsoft Office), and double-click *normal.dot*.

Select *View•Header and Footer* to display the Header and Footer toolbar, and click the leftmost button on the toolbar (shown below) to switch to the footer area of the document.

Now, select *Insert•Field*. Choose *Document Information* in the 'Categories' list of the Field dialog box, and choose *FileName* in the 'Field Names' list (see **FIGURE 2**), then click *OK* to insert the field in the footer.

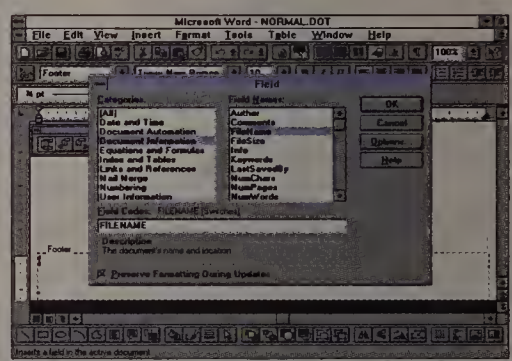
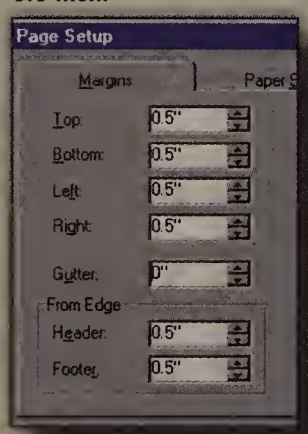


FIGURE 2: PUT YOUR FILE NAME WHERE YOUR FOOTER IS by modifying WinWord's normal.dot template.

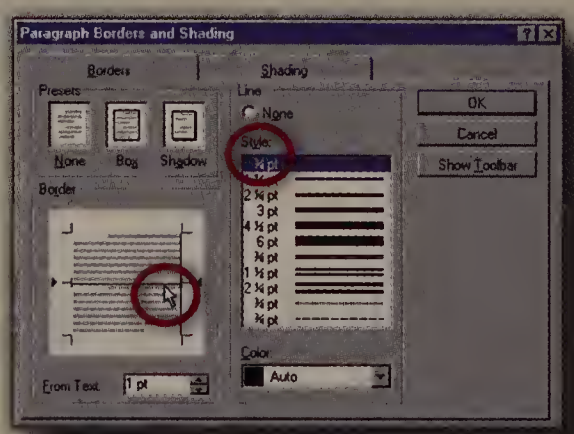
Apply any desired formatting, such as centering, to the inserted field, then select *File•Save* to store your changes. From then on, all your documents will automatically include a footer containing the document's file name.

Create Ruled Paper in WinWord

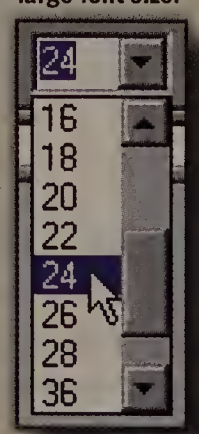
❶ Change all margins to 0.5 inch.



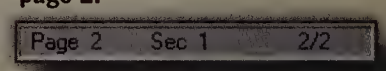
❷ Select a border and line style.



❸ Choose a large font size.



❹ Add lines until you reach page 2.



❺ Test the line spacing, then print copies for your kids.

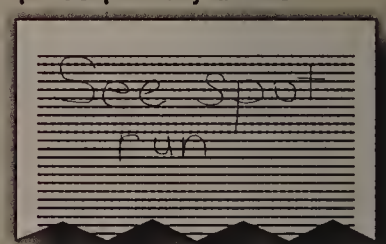


FIGURE 1: WINWORD RULES! Add horizontal lines to blank documents and give them to your kids for writing practice.

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Manual Feeding in WinWord

Q Is there a way to force WinWord 6.0 to pause after printing each page of a document? I sometimes need to print on special paper that will not feed from my laser printer's automatic paper tray, so I need to print each page, then have WinWord pause while I insert a sheet into the manual paper feeder.
Ryan Boone, Chantilly, Virginia

A It's easy to make WinWord print from your printer's manual feed tray. Select *File•Print*, then select *Options* in the Print dialog box. In the Options dialog box, choose *Manual Feed* from the 'Default Tray' list, then click *OK*. Back in the Print dialog box, click *OK* to begin printing. Your printer will prompt you to insert each page.

When you want to change back to automatic feed, select *File•Print*, click *Options*, select the original setting from the 'Default Tray' list, and click *OK*.

Automating Repeated Phrases in WordPerfect Documents

Q WordPerfect 5.1 for DOS let me temporarily store a repeatedly used phrase as a variable by pressing <Ctrl>-<PgUp> and assigning the phrase a number. Pressing <Alt> plus the number inserted the phrase in the text.

I've upgraded to version 6.1 for Windows, and I can't find that feature. Is it gone? If so, is there a replacement?
Jacob Ninan, Bangalore, India

A That feature is indeed absent from WordPerfect for Windows, but the new Abbreviation feature is a good substitute. It lets you create a list of abbreviations for often-used phrases and keeps it permanently available for all your documents, instead of temporarily as in WordPerfect 5.1 for DOS.

To create an abbreviation, highlight the phrase you want to abbreviate, select *Insert•Abbreviations*, then click *Create* in the Abbreviations dialog box.

In the Create Abbreviation dialog box, type a short, easy-to-remember abbreviation for your entry, and click *OK*. Just be sure it's not an actual word.

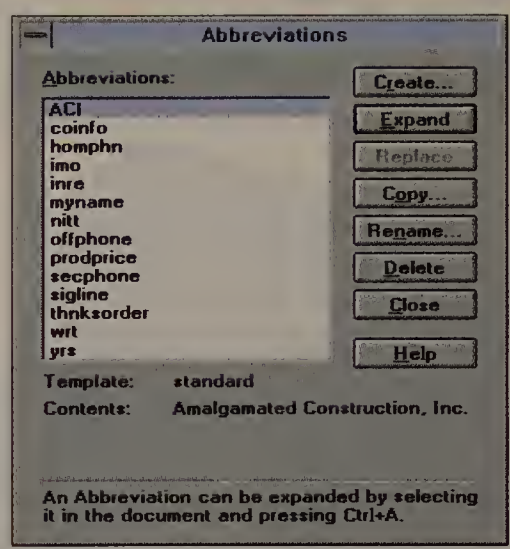

FIGURE 3: WORDPERFECT'S ABBREVIATIONS FEATURE lets you recall often-used phrases with a few keystrokes.

For example, for the phrase Amalgamated Construction Inc., you might enter the abbreviation ACI.

You can create as many of these abbreviations as you like, so you can set one up every time you type something you'll need again (see **FIGURE 3**). Click *Close* to return to your document.

To insert a phrase into a document, type its abbreviation and press **<Ctrl>-A**. Abbreviations are case-sensitive: If you created your abbreviation in uppercase, you must type uppercase letters to expand it. If you forget an abbreviation, select *Insert•Abbreviations*, choose the abbreviation from the list in the Abbreviations dialog box, then click *Expand* to insert the term at the cursor location.

Speeding Up Word Pro 96

Q I just upgraded from Lotus Ami Pro 3.1 to Word Pro 96 for Windows 3.1 and have noticed that the new program is much slower, especially when starting, loading, and saving files, and during many normal editing operations. I'm running Word Pro on my 66-MHz 486 DX/2 with 8MB of RAM. Is there anything I can do to make it faster?
Don Litvin, Brook Park, Ohio

A Our tests of Word Pro 96 for Windows 95 show a similar slowdown (see "War of the Words: Lotus Word Pro vs. Microsoft Word," March). We can't rewrite the program, of course, but here are some steps you can take to speed up either version of Word Pro:

1. Upgrade your memory to 16MB of RAM. For Word Pro to run at all, 8MB is the bare minimum. Even an upgrade to 12MB will help a lot.

2. Select *File•User Setup•Word Pro Preferences*, click the *General* tab, and change the *Undo Levels* setting from 100 to a smaller number—I suggest 10.

3. In the same dialog box, click the *Disable* drop-down list and check any option you don't need—good candidates are *SmartCorrect*, *Small file format*, and *Welcome Dialog* (see **FIGURE 4**). Windows 95 users whose documents don't contain OLE objects might also mark *OLE Automation* and *OLE unless required*. Click *OK*. The options you checked will remain disabled until you remove the check marks.

4. With a document open, select *View•Show/Hide*. If *Misspelled Words* is checked, click it to disable the as-you-type spelling checker.

5. Select *View•Draft*. This speeds up editing, but you'll lose the ability to see exactly how your documents will print.

Lotus has promised an update release for the Windows 3.1 version that should increase performance, but at press time had not announced when.

By George Campbell

George Campbell is a contributing editor for PC World *and a contributor to* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Word Processing *welcomes your tips and questions and pays $50 for published items. See page 14 for contact information.*

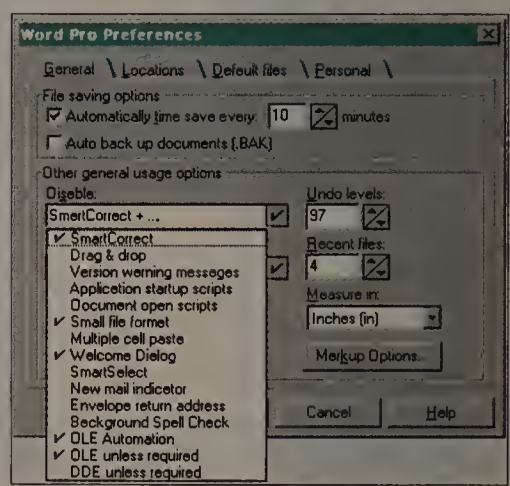

FIGURE 4: BOOST WORD PRO'S SPEED by disabling seldom-used options.

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WINDOWS Q&A

Printing Any Text to a File

Q I have a financial application that can generate reports only to the printer, not to the screen or to a file. Is there a way I can tell Windows to print this information to a file?
Michel Martineau, Montreal, Quebec, Canada

A Yes indeed. In fact, printing to a file is a great way to add text-only exporting to any Windows application, and it works in Windows 3.1 and 95.

Here's what to do in Windows 3.1. In the Windows Control Panel, double-click the *Printers* icon. Click *Add* and select *Generic/Text Only* from the list of printers. Click *Install* and follow the prompts to install this driver; you may need your Windows installation disks. Next, select the *Generic/Text Only* driver from the list of installed printers and click *Connect*. From the ports list, select *FILE:* and click *OK*. Exit the Control Panel. In your application's Print menu, turn off any header, footer, and page number options, and select *Generic/Text Only* from the list of printers. Windows will prompt you to type a path and name for your text file. Once you have your text file, you may need to do some editing and formatting in a word processor, but you'll get most of the information the way you want it.

To do the same in Windows 95, choose *Start•Settings•Printers* and double-click the *Add Printer* icon. Click *Next* in the Add Printer Wizard window. Select *Local printer*, and click *Next*. From the Manufacturers list, select *Generic*. 'Generic/Text Only' will be highlighted in the Printers list. Click *Next*, select *FILE:* from the Available ports list, and click *Next*. Type a name for the printer or use the default. If you plan to use this feature often, select *Yes* to make it your default printer. Then click *Next*. Select *Yes* or *No* in response to the test page prompt, and click *Finish*. If necessary, Windows will prompt you for a disk or CD-ROM to finish the installation. If you asked for a test page, specify a name and location for the text file that will be created when you click OK. As in Windows 3.1, remove any extraneous print formatting like page numbers. Then tell your application to use this printer for files you want exported to text.

Customizing Right-Mouse Menus for All Your Windows 95 Files

Q I prefer to have Windows 95 hide three-letter file extensions, but occasionally I need to change a file's extension—from *file*.doc to *file*.txt, for example. Windows won't let me do this with the normal rename functions. I have to either use a DOS window or change my View Options in Explorer. Is there an easier way to change extensions when I want, but keep them hidden most of the time?
Eric McAdams, Washington, D.C.

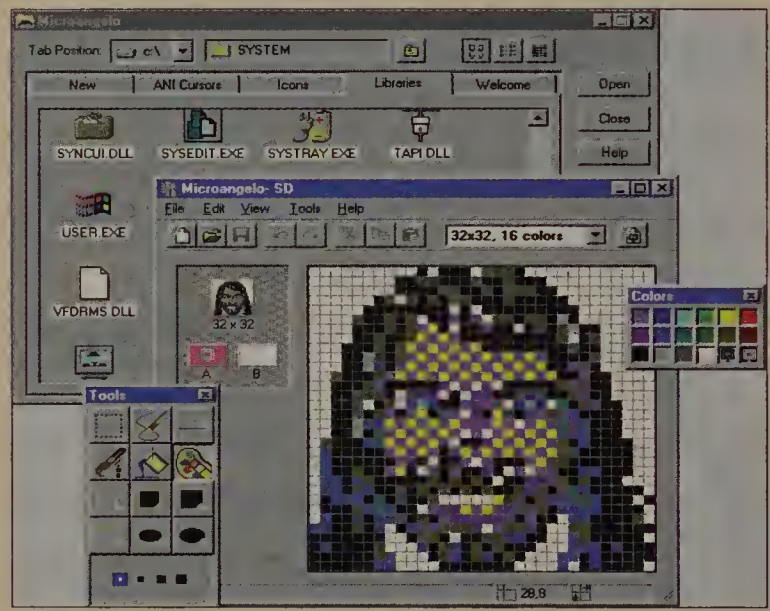
A You can add this function to the menu you see when you right-click a file name. In fact, by editing Win 95's Registry, you can add programs and batch file commands to the right-mouse menu for *any* file type. This method lets you easily access programs that act on most file types, such as file viewers or compression utilities like PKZip. You can also add to the right-mouse menu any batch files you use often, such as one that formats floppy disks (see "Adding a New Command to Your Right-Mouse Menu" for an illustration of this technique).

In your case, let's start by creating a batch file that can rename file extensions. In Notepad or another text editor, create a batch file with the following two lines (the paths can differ but it's easier if you use the same location for all files described here):

```
@echo ren %1 %%1 > c:\windows\r.bat
start c:\windows\r.pif
```

Save this batch file with a name like **renamer.bat** in a convenient location like the Windows folder. Open Explorer or

Windows Toolbox: Icon Do It Myself



Windows 95 adds a lot of pretty new icons and even animated cursors. But check out Microangelo—the ultimate tool for managing, editing, and creating icons and cursors. This shareware package includes three program modules: Browser, for viewing individual icon files or those stored as libraries (multiple icons in a single .exe or .dll file, for example) and launching the other modules; Studio, for creating and editing individual icon files; and Librarian, for extracting, editing, and organizing icons in new or existing libraries. The package also includes a utility that lets Windows 95 display icons in all possible colors. You can get the Browser and one other module for $25, the Browser and two other modules for $45, or all modules for $60. The package is available as muangelo.exe on PC World Online and other online services.

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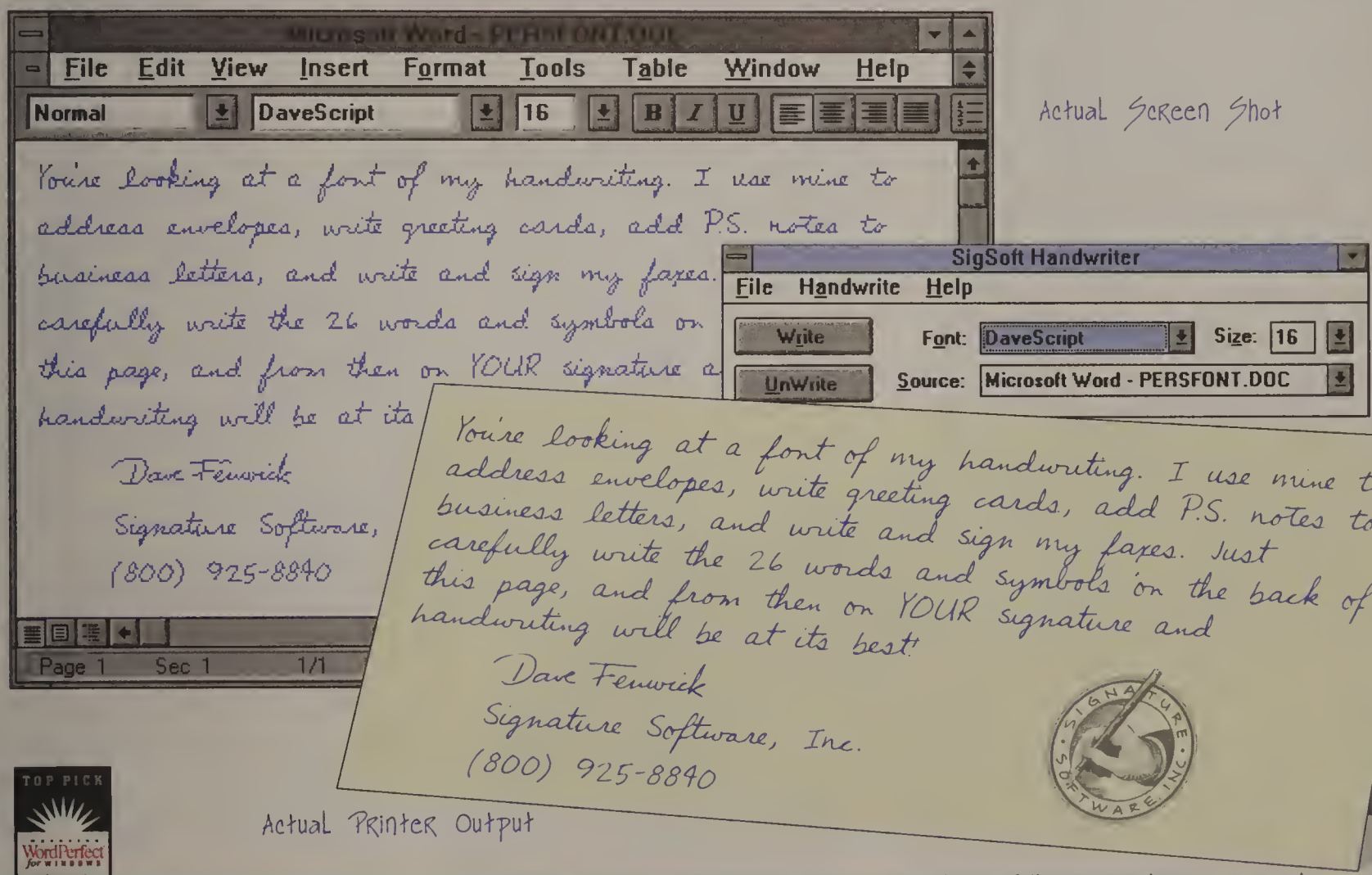

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3. Write naturally and consistently. Practice first on a separate sheet of paper. Remember, what you write here will become the final font.
4. For best results use a rollerball or fibertip pen. Do not use ballpoint pens or pencils!
5. Use the grid lines in the boxes as an aid to maintain consistent height and slant. Be sure capital letters are proportional to lower case letters.
6. Write your capitals normally. Consider the appearance of capitals when used at the beginning of words AND when words are all capitalized. Don't forget the punctuation!
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My Computer, find renamer.bat, and customize it by right-clicking its icon and choosing *Properties*. Click the *Program* tab, and from the *Run* drop-down list, choose *Minimized*. Check *Close on exit*, then click *OK*. Windows creates a special Shortcut file known as a PIF, or program information file, in the same folder. Find that file at the bottom of the list of files—it's called Renamer—and create a copy of it by right-clicking it, dragging it with the right mouse button to a new spot in the same folder, and choosing *Copy Here*. Name the copy **r**. Right-click this new Shortcut file and choose *Properties*. Click the *Program* tab. In the box at the top, type a prompt like **Type a file name & extension**, and in the command line box, type **c:\windows\r.bat ?**. Then click *OK*.

How does it work? The first line in renamer.bat creates a batch file called r.bat that includes the name of any currently selected file (represented by %1) and adds a variable placeholder for the new name (%%1). The second line runs the Windows Shortcut you create a couple of steps later. The ? in that Shortcut's command line prompts you for a new file name, then passes that new name to the placeholder in the r.bat file, which then renames the file. Both renamer.bat and r.bat should run relatively invisibly as buttons on the Taskbar and then disappear when they're done (thanks to the Run: Minimized and Close on exit options).

To put this newly created feature on your right-mouse menu, you'll have to edit the Windows Registry. As always, before you do, make a backup copy of these files in the Windows folder: user.dat, user.da0, system.dat, and system.da0. (If you don't see the files, choose *View • Options* in My Computer or Explorer, click the *View* tab, select *Show all files*, and click *OK*.)

Start the Registry Editor by choosing *Start • Run*, typing **regedit**, and pressing **<Enter>**. Click the plus sign next to HKEY_CLASSES_ROOT to expand that branch, and select the * folder at the top of the list. As you might guess, this entry represents all file types.

Choose *Edit • New • Binary Value*. Name this value **EditFlags**, and press **<Enter>**. Double-click the new value; if it's still selected, press **<Enter>** again.

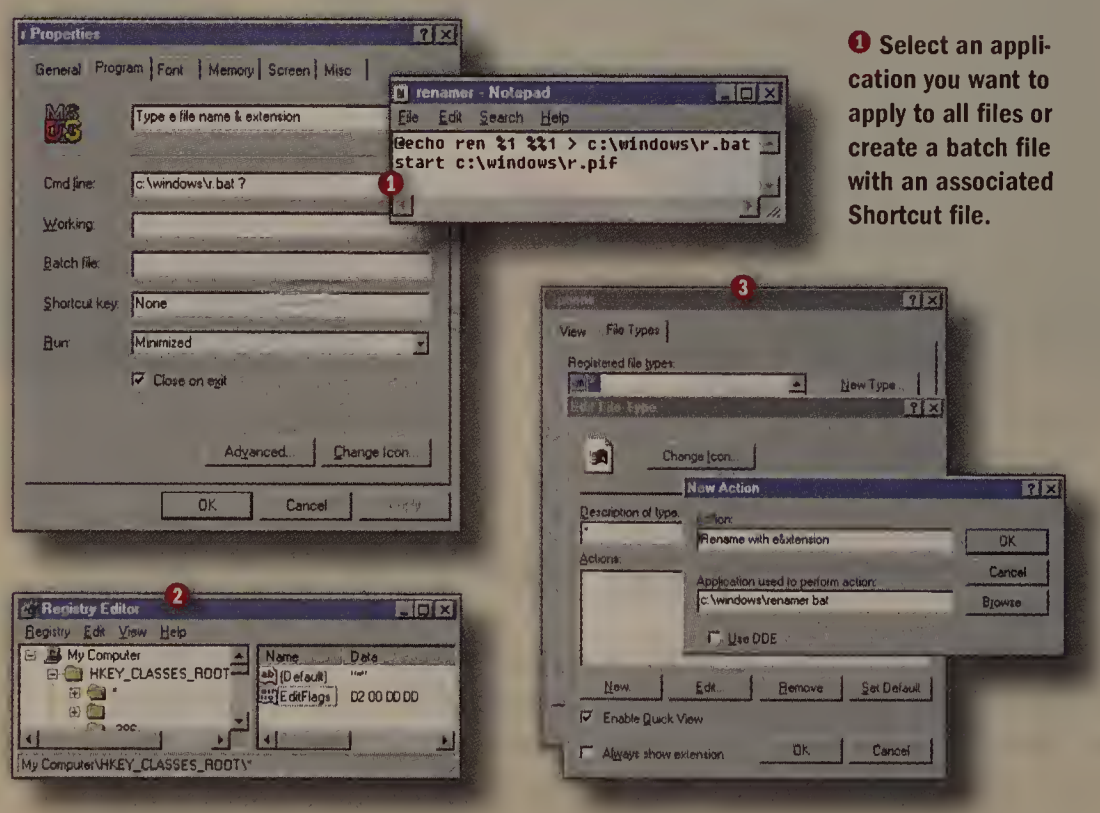
Type **02 00 00 00** (without the spaces; the Registry Editor adds them automatically). This change will let you specify functions for all file types in Explorer's Options dialog box. Now exit the Registry Editor.

In Explorer or My Computer, choose *View • Options* and click the *File Types* tab. Select the * file type, which should be at the top of the list, and click *Edit*. Click *New* to add new actions. In the Action box, type the wording you want to appear on your right-mouse menu. Don't use 'Rename' alone, since that function already exists. Instead, type something like **Rename with e&xtension**. The & underlines the following letter, x, and makes it a keyboard shortcut; put the & elsewhere if you want a different shortcut. In the 'Application used to perform action' box, type **c:\windows\renamer.bat** (your path may differ). Click *OK*, then click *Close* twice.

Now when you right-click a file you'll see your 'Rename with extension' entry. Choose it, and a window will prompt you for the new file name. Type the name in the Parameters box (but no path information—the DOS rename command doesn't like that), adding quotation marks around your new file name if it includes any spaces. Then click *OK*. Renaming a file like this often makes it appear in a new place in the folder, but you shouldn't have any trouble finding it.

You follow the same basic steps in the Registry and the File Types tab for any program or batch file you want to add to the right-mouse menu. To apply this technique to a DOS command-line utility, see the following item.

Adding a New Command to Your Right-Mouse Menu



❶ **Select an application you want to apply to all files or create a batch file with an associated Shortcut file.**

❷ **In the Registry Editor, add a new binary value named EditFlags to the * file type and type in the value data shown.**

❸ **In Explorer's View • Options dialog box, edit the * file type, adding a new action that runs your application or batch file.**

Zip It Up in Windows 95

Q I know there are a lot of Windows shells for zipping files, but I'm short on cash. Can I get Windows 95 to help me use PKZip on a selected file without running to a DOS prompt?

Stanley Stromberg, Baltimore

Type this in at 10:30... **...Print this out at 10:33.**

```
Get price quotes.
Is money in the budget?
   (Yes)
   Fill out Purchase Requisition
   Form #P-27.
   (No)
   Fill out Purchase Requisition
   Form #P-95.
Purchase Amount:
   (Under $100 use corporate
   credit card)
   (From $100 to $999 use purchase
   order terms 2-10 Net 30)
   (From $1,500 to $5,000 use
   purchase order terms Net 15)
Submit Requisition.
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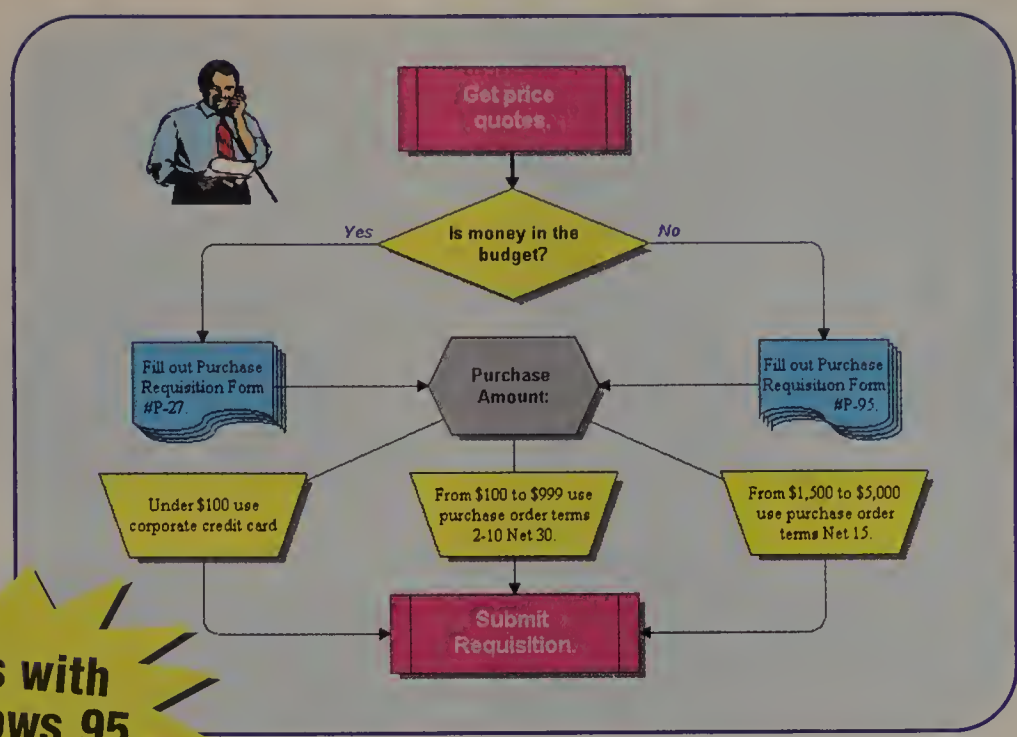

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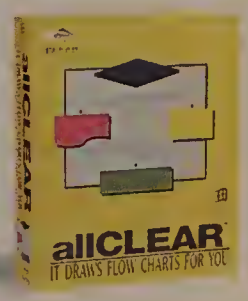

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A No problem. You can use the technique described in the preceding item to add a zipping batch file to your right-mouse menu. First, in Notepad or another text editor, create the following two-line batch file (substituting your own path to pkzip.exe): The first line is **@echo c:\zip\pkzip.exe –a %%1 %1 > c:\windows\zipme.bat**, and the second is **start c:\windows\zipme.pif**.

Save this file in the Windows folder with a name like **zipper.bat**. Then create PIFs for both zipper.bat and zipme.bat: Right-click *zipper.bat* and choose *Properties;* click the *Program* tab, select *Minimized* from the *Run* drop-down list, and click *Close on exit*. Click *OK*. Copy the Shortcut, zipper, and name the resulting new Shortcut **zipme**. Right-click this Shortcut, choose *Properties*, and click the *Program* tab. In the top box, type the prompt **Type name of .zip file to use**, and in the command line box, type **c:\windows\zipme.bat ?**. Click *OK*.

Now follow the instructions in the previous tip for modifying the Windows Registry. Then in Explorer choose *View•Options*, click the *File Types* tab, and create a new action for the * file type. Name the action **&Add to zip file** and type **c:\windows\zipper.bat** at the 'Application used to perform action' prompt. Close all dialog boxes.

Now right-click any file and choose *Add to zip file* (or whatever you named your command). When prompted, type the full path and name of the .zip file you want the selected file added to. The downside to this method is that you can add only one file at a time to a .zip file. To use wild cards to add multiple files, you'll need to do more typing: Choose *Start•Run*, type **zipper** followed by a file specification—for example, **zipper c:\doc*.doc**. Then press **<Enter>**. You're all set to make some quick zips.

Make Notepads for All Occasions

Q Is it possible to put more options (*.bat, *.ini, *.sys) in the 'Files of type' section of Notepad's File Open dialog box? I use Notepad in Windows 3.1 to edit system files, and it would be nice if that could be made easier.
Samuel Bible, CompuServe

A Unfortunately, you can't add to the list of file types in the File Open dialog box in Windows 3.*x*. However, if you prefer clicking icons to typing file specs, you can create multiple versions of Notepad to edit various file types.

You do this by editing notepad.exe. When editing text in any executable file, you must add exactly the same number of characters you remove: If the file is one character larger or smaller than the original, it won't work.

First, start Windows Write. Open notepad.exe in the Windows directory. When prompted, click *No Conversion*. Choose *Find•Replace*. Type ***.txt** in the Find What box, and type ***.ini** in the Replace With box. Click *Replace All*, then *Close*. You can also search for **Text Files** and replace it with something like **Sys. Files** (include the period or an extra space so the number of characters is the same). Then choose *File•Save As* and name the file **ini_edit.exe**.

Repeat these steps to create a Notepad version for .sys files, .bat files, and so on. You can create icons for each version in Program Manager and launch whichever one you need.

By Scott Dunn

PC WORLD online *The files mentioned in this article are available on PC World Online. Scott Dunn is a contributing editor for* PC World *and a principal author of* The PC Bible, 2nd Edition *(Peachpit Press, 1995, 800/283-9444).* Windows *welcomes your questions and pays $50 for published items.* *See page 14 for contact information.*

The One-Minute Taskbar Workout

The Windows 95 Taskbar can speed through your little chores if you know how to use it. This workout will have you clicking in all the right places.

Manage windows: Right-click a blank area of the Taskbar for a menu that makes quick work of window management—tiling, cascading, minimizing, auto-hiding, or even undoing your last menu choice.

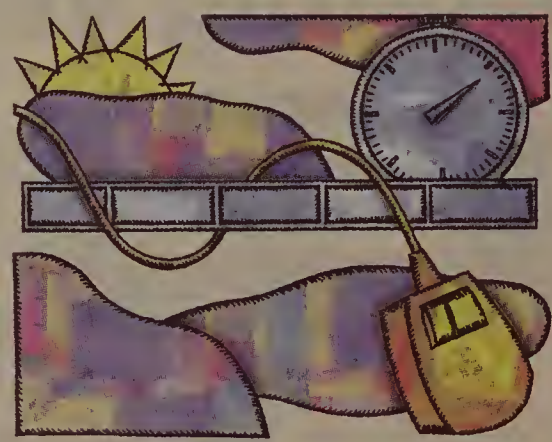
Customize the Start menu: To get a window showing the Start Menu folder, right-click the Start button and choose *Open* (for a My Computer–style window) or *Explore* (for an Explorer-style window); or choose *Find* instead of the slower Start•Find•Files or Folders.

Bring up hidden windows: Left-click an application button to bring that application to the front and make it active.

Manage hidden windows: Right-click an application button to perform basic window management on the application—the Close command is especially handy.

Set the time: Left-double-click the clock (or right-click the clock and select *Adjust Date/Time*) to reset the computer's clock and calendar.

Get the date: Hold the mouse pointer over the clock for a couple seconds to see the day of the week and the date.



Set the volume: If you have a sound system installed, left-click the speaker icon next to the clock to see a pop-up volume control with a mute option.

Customize audio: Right-click the speaker icon to see a pop-up menu for displaying the Volume Control dialog or the Audio properties sheet.

Manage printing: While printing, left-double-click the printer icon to check printing status and reorder, pause, or cancel jobs waiting to be printed.

Check print status: While printing, hold the pointer over the printer icon for a couple seconds to get a quick status report.

RICHARD DOWNS

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DATA MANAGEMENT Q&A

Sending Letters to Select Customers

Q I keep my customer and sales information in Access 7.0 and want to send letters to all who haven't placed orders in the last six months. Should I create the letters in Microsoft Word or in the Access report designer?
Al Jackson, Atlanta

A It's quicker to create the letter in Word and then merge it with the addresses from selected records in Access. Likewise, if your data is stored in Paradox, you can merge it with a letter created in Word or WordPerfect. Approach's Form Letters feature lets you create the letter in Approach, then combine it with selected records. I'll outline the steps for all three programs.

Access: You can start Word's Mail Merge Wizard from Access to create your letters. First you'll want to create a query to select inactive customers. Open a new query window with your customer table and add the fields you want to include in the letters. Also include the field that will allow you to select inactive customers with criteria like **<= Date() - 180**. Then save the query as **Inactive Customers**.

In the Database window, click the *Queries* tab and highlight *Inactive Customers*, then start Word by clicking the down arrow next to the OfficeLinks button and selecting *Merge It* (in Access 2.0, click the *Merge It* button).

In Word, type your letter. When you reach a spot where you want to include a field from the Access query, place the cursor at the insertion point, click *Insert Merge Field*, and select the field from the drop-down list. When you finish the letter, choose *Tools•Mail Merge* and click *Merge* twice to create the merge document and return to Access.

Paradox: Paradox 7's Merge Expert helps you create a letter (or any other type of document) in Word, WordPerfect, or Paradox itself. In earlier versions of Paradox for Windows, you'll need to create the letter within Paradox; instructions are given a little later on.

If you want to compose your letter in WordPerfect, you have to run a query to select the inactive customers before you invoke the Merge Expert. You also have to rename the answer table, since the expert won't work directly with an answer table. After renaming the table, click *Merge Expert* and follow the steps, selecting the renamed table in step 3.

If you're using Word, you don't have to run a query. Just pick your customer table in step 3 of the Merge Expert, choose *Tools•Mail Merge* in Word, and in step 3 of the Mail Merge Helper dialog box, click *Query Options*. On the Filter Records page, enter your customer selection criterion and click *OK*. Click *Merge* in the Mail Merge Helper.

In earlier versions of Paradox for Windows, you can create a letter within Paradox, but there's no expert to help. Still, it's not hard. In Design mode, open a new report based on the query that selected the inactive customers, and use the Text tool to create a text object to hold the letter. Type the letter, pressing **<F5>** where you want to insert a field. Paradox inserts an undefined field object in the text object. Click outside the text object, then click twice on the new field object to select it. Right-click it, choose *Define Field*, and select a field from the list or click the ellipses to select from the Define Field Object dialog box.

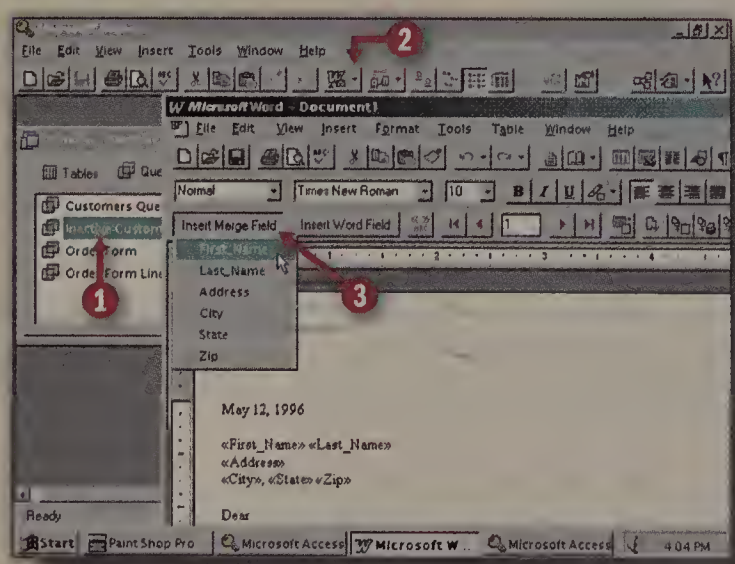
Approach: In version 3.0 or Approach 96, choose *Create•Form Letter* and step through the tabbed Form Letter Assistant. In the Design window, type the letter, selecting *Text•Insert•Field Value* (in Approach 3.0, *Text•Insert•Field*) where you want to insert a field.

To print letters for inactive customers only, click the tab for your form letter (under the SmartIcons), then click the *Find* button. (In Approach 3.0, go into Browse mode first.) Enter the criteria to select the inactive customers, and press **<Enter>**. Approach will print letters for those records only.

By Celeste Robinson

Celeste Robinson is a contributing editor for PC World *and coauthor of* Mastering Paradox 7 for Windows 95 *(Sybex, 1996, 800/227-2346).* Data Management *welcomes your questions and pays $50 for published items. See page 14 for contact information.*

Use Access Records in a WinWord Letter



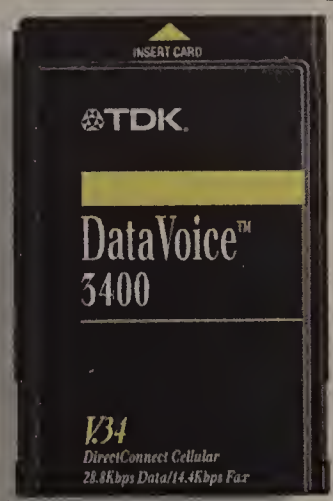
❶ In the Access Database window, highlight the query you used to select the records that you want to use in your letter.

❷ Click the down arrow next to the OfficeLinks button and select Merge It to start the Mail Merge Wizard.

❸ Type your letter in Word clicking the Insert Merge Field button wherever you want to insert an Access field and then choosing the field. When you're finished, choose Tools • Mail Merge and click Merge twice to do the merge and return to Access.

IN THE ACCESS DATABASE WINDOW, highlight a query and click the OfficeLinks (or Merge It) button to launch Word and create a letter.

Talk to Me, Baby.



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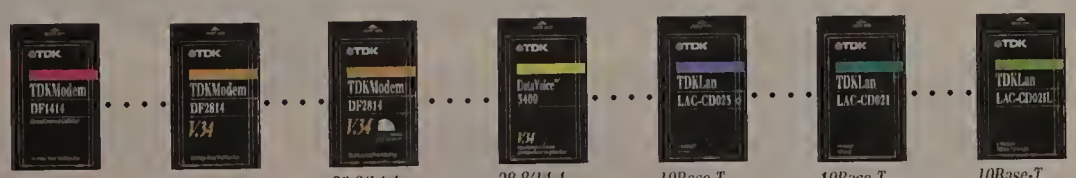

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ONLINE Q&A

HTML 101: Learning to Write a Web Page

Q Can you recommend some books or other resources for learning how to create a page on the World Wide Web?
David Prryman, New York

A Yes, try the free program Web Wizard: The Duke of URL, by ARTA Media Group. You can download the 16-bit or 32-bit version from ARTA's Web site (http://www.halcyon.com/artamedia/webwizard/welcome.html), select web16bit.exe or web32bit.exe; or from PC World Online (webwiz.zip).

Web Wizard asks you a few questions, then produces a simple home page complete with graphics, text, and links to other pages. Creating a page takes just 5 minutes; all you need to do is upload the applicable files to your directory on your Internet service, and you're on the World Wide Web—no HTML coding required.

If you're still itching to learn HTML coding, I recommend the books *Teach Yourself Web Publishing With HTML in a Week* (Sams Publishing, 1994, $25, 800/ 428-5331) and *Teach Yourself More Web Publishing With HTML in a Week* (Sams Publishing, 1995, $29), both by Laura Lemay.

The easiest way to master enough HTML coding to build your own Web page is to see how it's been done on other pages. If you use Netscape Navigator, you can read the HTML coding for any page you log in to by heading to the *View* menu and selecting *Source*. If you use CompuServe's Mosaic browser, click *Document Source* in the *File* menu.

- Web Wizard: The Duke of URL, free; ARTA Media Group; Web page: http://www.halcyon.com/artamedia/webwizard/welcome.html

Reader service no. 641

Jumping Into the MUD

Q I've been hearing a lot about MUDing on the Internet. What is it?
Jamieson Andrews, Daly City, California

A MUD, which refers to *multiple user dimension*, *multiple user dungeon*, or *multiple user dialogue*, describes a fantasy/role-playing game played on the Internet. You log on to a MUD computer via Telnet; take on the persona of a character you create or receive over e-mail; then ramble around the MUD site, exploring rooms, chatting with other characters, fighting monsters, and solving puzzles.

There are many different kinds of MUDs, from combat-oriented to warm and fuzzy. There are MUDs in which players learn English as a second language, and there are MUDs in which scientists exchange their research findings. Some MUDs can be accessed via the World Wide Web (see **FIGURE 1**).

To learn more, log in to the MUD Connector (http://www.absi.com/mud/). You should also get copies of frequently asked questions by sending an e-mail message to mail-server@rtfm.mit.edu containing these commands:

send usenet/news.answers/games/mud-faq/part1
send usenet/news.answers/games/mud-faq/part2
send usenet/news.answers/games/mud-faq/part3

Every MUD is different. Some require that you register via e-mail, and some let you join online. And each MUD has its own rules and etiquette.

Finally, there are several Usenet newsgroups that are devoted to MUDing. The best one for newcomers is rec.games.mud.misc.

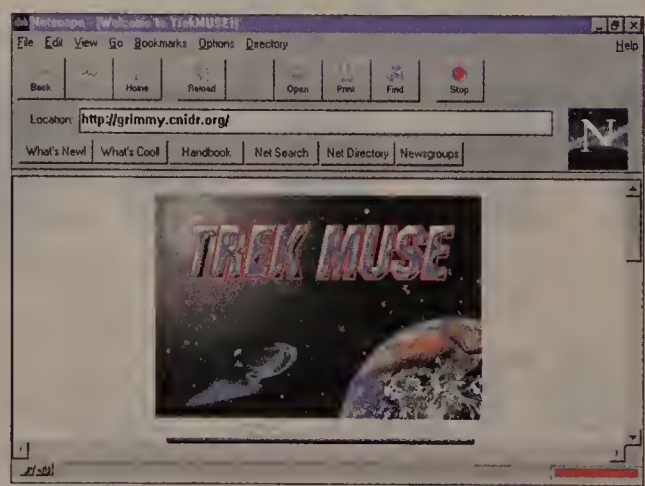

FIGURE 1: PLAY OUT YOUR FANTASIES IN MUD. For more colorful MUDing, head to the Web.

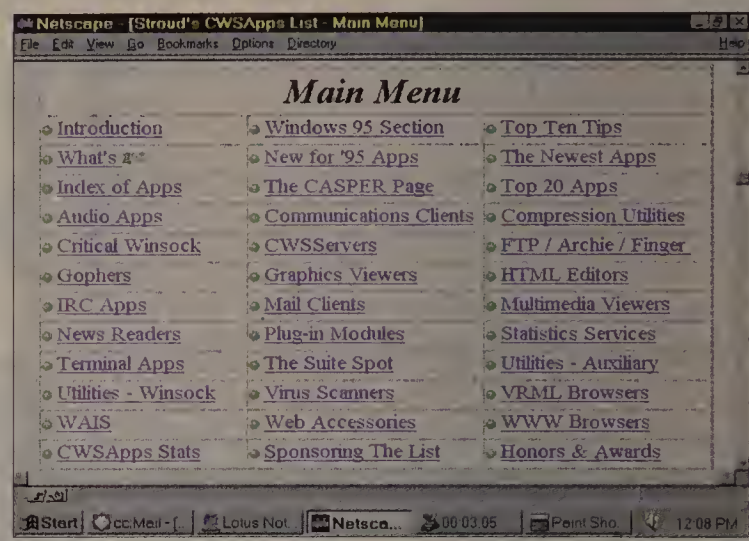

FIGURE 2: DOWNLOAD THE BEST WINSOCK APPLICATIONS from Stroud's Consummate Winsock Apps List on the Web.

Finding Windows 95 Shareware and Advice on the Net

For the very best selection of Internet-related shareware and freeware, head to Stroud's Consummate Winsock Apps List (http://cws.wilmington.net/). You'll find news readers, viewers, virus scanners, and the best of the newest Windows 95 software (see **FIGURE 2**).

Gnashing your teeth trying to get such Internet tools as Eudora and Netscape Navigator working with Windows 95? Check out Mark Leary's Win95Net Web page (http://www.w95net.com/). You'll find details on how to configure Windows' TCP/IP

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stack, Internet-related shareware for Windows 95, plus links to other pages with troubleshooting tips and advice.

More on Communications Scripting in Windows 95

A dozen readers responded to "Automate Internet Log-Ons in Windows 95" (*Online*, February). They pointed out that a scripting tool that can automate Internet SLIP/PPP log-ons is hidden on the Windows 95 CD-ROM. The Dial-Up Scripting Tool is not included on the floppy disk version of Windows 95, but you can download the tool from Microsoft's Web site (http://www.microsoft.com/windows/software/admintools.htm). You can also download its documentation, which is in a file called script.doc. Curiously, this documentation is not included on the Windows 95 CD-ROM, although it is included in the Windows Plus pack (also in a file called script.doc).

To install the Dial-Up Scripting Tool from the CD-ROM, head to the Windows Control Panel, double-click the *Add/Remove Programs* icon, click the *Windows Setup* tab, click the *Have Disk* button, and install the tool from d:\admin\apptools\dscript.

You create your log-on script as a nonformatted text file in WordPad or your word processor. Then you load the Dial-Up Scripting Tool and link the script to an already configured Internet connection by choosing from the 'Connections' list and typing the file name and location of the script in the 'File name' box, as in **FIGURE 3**. Click *Apply*, and you're finished. To learn more about creating a log-on script, read the Scripting Tool's documentation.

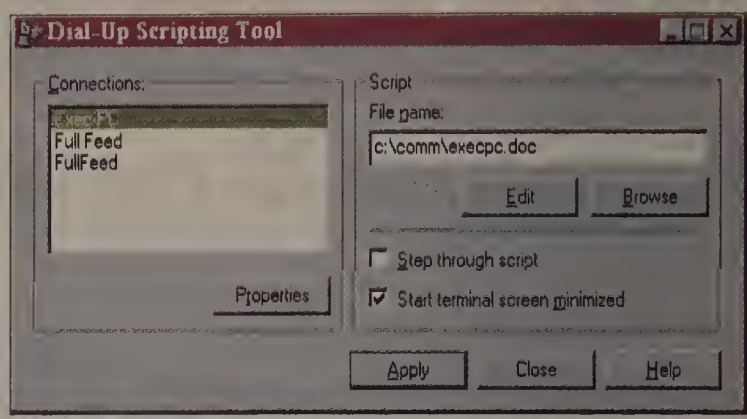

FIGURE 3: AUTOMATE INTERNET SLIP/PPP LOG-ONS with Windows 95's Dial-Up Scripting Tool.

Archive America Online Messages

TIP

America Online's FlashSession stores all your e-mail so you can read it later when not connected to the service. However, it doesn't take long for AOL's mail queue to grow, causing the feature to slow down.

You can archive your old AOL messages by heading to the AOL directory called idb. There you'll find files with names that begin with your screen name and end with the extensions .arh, .pnd, and .mal. For instance, if your screen name is JSanchez, the files will be named jsanchez.arh, jsanchez.pnd, and jsanchez.mal. Archive these files with a compression utility like PKZIP, then delete the original files.

To read your e-mail later, when you're not connected to AOL, rename any new files that AOL has created with .arh, .pnd, and .mal extensions—for example, new.arh, new.pnd, and new.mal.

Then just unzip the archive. You'll be able to read the old mail with AOL software.

Mason McCuskey, Arvada, Colorado

Browse the Internet Library

TIP

CompuServe offers a huge library of Internet tutorials and instruction files. Go **internet** or click the *Internet* button on the Basic Services menu, click *Internet Forums* from the resulting menu, then choose *Internet New Users Forum*. In the forum, click the *Library* icon, and select *Internet Beginner* (see **FIGURE 4**).

By Judy Heim

PC WORLD online *The files mentioned in this article are available on PC World Online. Judy Heim is a contributing editor for* PC World *and author of* I Lost My Baby, My Pickup and My Guitar on the Information Highway *(No Starch Press, 1995, 800/420-7240).* Online *welcomes your questions and tips and pays $50 for published items. See page 14 for contact information.*

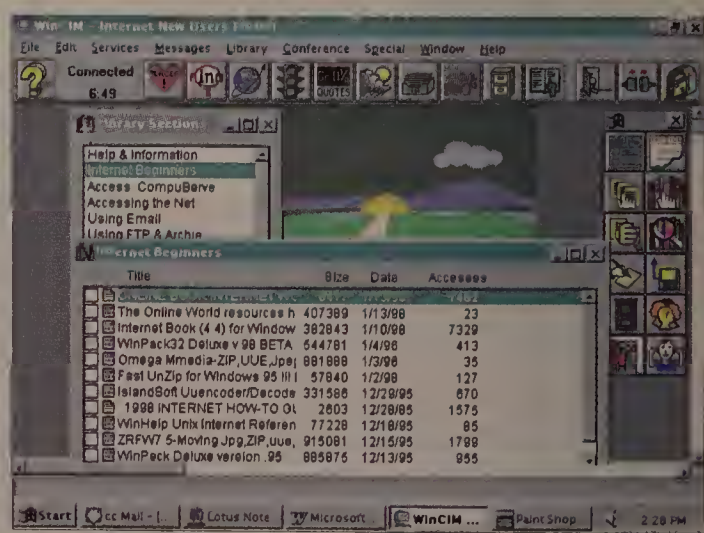

FIGURE 4: GET MORE OUT OF THE INTERNET by logging in to CompuServe's Internet New Users Forum.

This Month's Cool Internet Find

Learn everything you need to know to get low-cost airline tickets, including the best times and ways to travel, plus how to find airlines that offer special family discounts. It's all in the incredible Air Traveler's Handbook by Mark Kantrowitz, which appears regularly as a four-part e-mail message in the Usenet newsgroups rec.travel.air and news.answers.

You can download the handbook from the World Wide Web (http://www.cs.cmu.edu/afs/cs/user/mkant/Public/Travel/airfare.html). Or you can obtain it via e-mail by sending a message to mail-server@rtfm.mit.edu with the following four commands:

send usenet/news.answers/travel/air/handbook/part1
send usenet/news.answers/travel/air/handbook/part2
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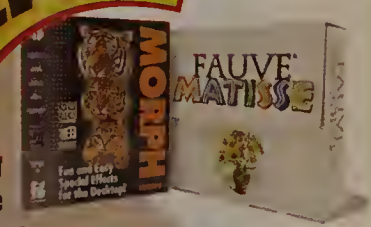

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HARDWARE Q&A

Is the Zip Drive Zippy Enough?

Q I need more disk space. Instead of upgrading my hard disk, I'm considering buying an Iomega Zip drive. It connects via the PC's parallel port or a SCSI card and has 100MB cartridges. At about $200 for the drive and $20 per cartridge, the price seems right. But is it fast enough to run programs?
Jason Minahan, Internet

A Swapping cartridges instead of swapping drives sounds like a good idea, doesn't it? The Zip drive is compact and light, which makes it great for carrying big files on the road, and it's so popular that you're sure to find other Zip drives in many locations. Unfortunately, in our tests, the Zip drive was too slow for running programs without frustration (see "Incredible Expanding Drives," March). And you can find much faster solutions if you're looking for a removable-media drive with virtually infinite storage capacity.

For the same price per drive and per cartridge, consider the SyQuest EZ135, a SCSI drive that runs about 50 percent faster than the Zip drive and holds 135MB per cartridge. You won't get hard disk speed, but you'll come close. If you're willing to pay more, Iomega's new $499 Jaz drive, a SCSI device, actually matches the speed of the average hard disk. It also uses huge 1GB cartridges that go for only $99 a pop. If the Jaz and future devices like it pan out, they may well offer the storage solution we've all been seeking.

- **Zip** $199.95, **Jaz** $499; Iomega; 801/778-1000
  Reader service no. 642
- **EZ135** $199.95; Syquest; 800/245-2278
  Reader service no. 643

The Great Disk Debate: EIDE Versus SCSI

Q I want to replace my 540MB hard disk with a 1.2GB model. Should I get a SCSI drive or an Enhanced IDE drive? What's the difference?
Antonio Osuna, Caracas, Venezuela

A For most PC users, the important difference between Enhanced IDE (EIDE) and SCSI is price rather than performance (for more details on SCSI-versus-EIDE performance issues, see the article "A Gigabyte Drive for $199?" as well as the table below).

SCSI drives cost at least 10 percent more than EIDE drives. Also, while most of today's PCs come with a built-in EIDE interface that any EIDE drive can plug into, they aren't likely to include a SCSI interface card, so add another $50 for a cheap SCSI card.

SCSI's advantages emerge when you try to connect multiple devices, such as a fast tape backup drive, a scanner, or most important, another hard disk. You can connect up to seven.

But configuring SCSI drives can be a pain. You must make sure each device has a unique SCSI ID, a number from 0 to 7 that you set on the device itself. Then you must plug in a terminating resistor (or flip a switch) to mark the end of the SCSI chain. If you connect an external and an internal device to the same interface card, you'll have to remove the terminating resistors from the card and make sure resistors for both devices have been installed.

If you're running DOS or Windows 3.1, you may need to load an Advanced SCSI Programming Interface universal driver in config.sys and add a driver specific to each SCSI device, which can lead to conflicts. But if you're running Windows 95 or just hooking up hard disks, the process is fairly smooth.

With EIDE, you can add only one more drive to the same connector. (Most new PCs come with two connectors, for a total of four drives.) Hanging two drives off the same cable can be frustrating, though, even if you remember to use jumpers to configure the first as master and the second as slave. Sometimes, old IDE drives and newer EIDE models refuse to operate on the same interface. And if you've hooked two drives to the same PCI or VL interface, EIDE's speed may be limited by the slowest device on the cable. So if one drive supports EIDE's Programmable I/O Mode 3 and another supports Mode 4,

Choosing the Right Hard Disk: EIDE Versus SCSI

EIDE	Capacity	Expansion	Performance	Installation
Pros	Cheaper cost per megabyte	Connector usually on motherboard, no extra cost	New systems put EIDE interface on fast PCI bus	Very easy installation if adding only one drive
Cons	Older systems require work-around to break the "528MB" limit	Two-drive limit per connector	Requires special driver for 32-bit disk access under Windows 3.1 and 3.11	Occasional compatibility or performance problems when two drives are on one cable
SCSI				
Pros	Larger maximum capacity	Seven devices can connect to one interface card	No performance degradation as devices are added	Wide array of devices can connect to interface
Cons	Costs at least 10 percent more per megabyte than EIDE	Requires extra-cost interface card in most systems	Daisy-chaining different SCSI devices may cause incompatibilities	Device ID numbers and terminating resistors complicate setup

WHEN YOU'RE SELECTING A DISK DRIVE, the EIDE-versus-SCSI decision has little to do with performance and a lot to do with price, convenience, and compatibility.

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both will likely top out at the slower Mode 3. (Some EIDE interfaces correct this.)

If your system lacks an EIDE-compliant BIOS, it will recognize only 528MB of your new 1.2GB drive. The best solution is to buy a card with its own EIDE BIOS; or upgrade the system BIOS, if possible.

Many people opt for the less expensive software solution provided by OnTrack's Disk Manager or Micro House's EZ Drive, which come free with most drives. Both packages require a driver and increase the possibility of software conflicts, and they put the hard disk parameters in the first sector, so if that sector goes bad, you're dead. My advice: Get Promise Technology's new driverless EIDE Max if you can't upgrade your system BIOS to EIDE.

Finally, if you want 32-bit disk access for your big EIDE drive under Windows 3.1 or 3.11, you need to install a special driver via system.ini, another source of potential conflict if you have two IDE drives (see "Faster Windows With 32-Bit File and Disk Access," *Hardware*, July 1995).

Since you want to replace rather than add a drive, you'll save money by going the EIDE route. If you have a newer system, you may also get the benefit of a fast PCI-based EIDE interface. To hook a SCSI drive to the PCI bus, you'd need a PCI SCSI card—for a few hundred bucks more.

- **Disk Manager** $124.95; OnTrack Computer Systems; 612/937-1107
  Reader service no. 644
- **EZ Drive** $39; Micro House; 800/926-8299
  Reader service no. 645
- **EIDE Max** $29; Promise Technology; 800/888-0245
  Reader service no. 646

Price/Performance for Pentium Pretenders

Q I'm about to buy a new motherboard and need some information on the NexGen chips. Is it true that a NexGen Nx586 P100 chip delivers the same performance as an Intel Pentium-133?
Jesse Pratt, Internet

A In fact, the Nx586 P100 is slightly slower than a 100-MHz Pentium because it runs at 93 MHz. NexGen had the bright idea of marketing its 93-MHz chip as equivalent to a 100-MHz Pentium. The ploy worked until Intel introduced a new chip set (the satellite chips that support the CPU), which made the average Pentium-100 system several percentage points faster than the average Nx586-100 system.

NexGen recently introduced the Nx586 P120 and P133 chips, which *do* run at 120 MHz and 133 MHz, respectively—and they should run a bit faster than their Intel equivalents. But the Nx586 is not pin compatible with the Pentium and requires its own motherboard with an expensive secondary cache that runs at CPU speed. Alaris is one of a few companies that make Nx586 motherboards, which generally cost more than the best Pentium motherboards.

For an alternative to Intel, get a motherboard with the Cyrix 6x86. This chip runs about 20 percent faster than a Pentium at the same clock speed and plugs right into a Pentium socket. With a simple system BIOS change, the Cyrix 6x86 will run nicely in a wide range of Pentium motherboards, and pricing is competitive. ▶

COMING UP

Windows Utilities Superguide: Bigger, Better, Faster, More

They say Windows 95 has all the functionality you'll ever need—but don't take their word for it. We looked at utilities that come with Windows 95 versus third-party add-ons—uninstallers, backup software, virus protection, and more—and found plenty of room for improvement in Win 95's utilities. Plus essential Windows 3.1 utilities.

Windows 95 Graphics Boards Set New Rules

This isn't your old graphics board anymore. We've updated our Windows accelerator benchmark for testing with Windows 95. With most apps using multimedia, and video capabilities and compression pushing the envelope, graphics boards are more important than ever. Check out the latest *PC World* Top 10 Graphics Boards.

Also Next Month

- ▶ **Top 20 Power Desktops, Budget Desktops, and Notebooks, Plus the Top 10 Personal Printers, 15-Inch Monitors, and Modems**
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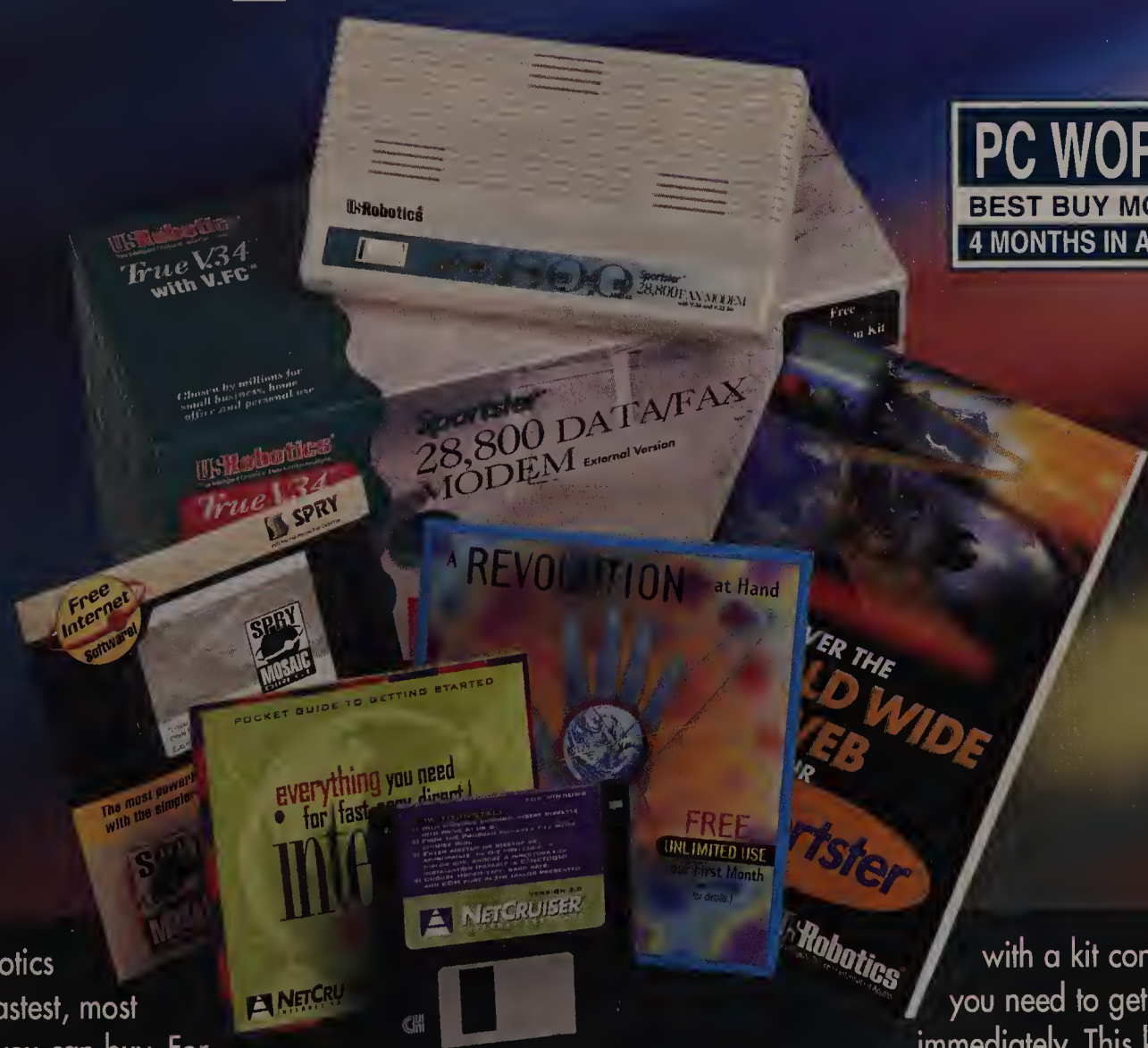

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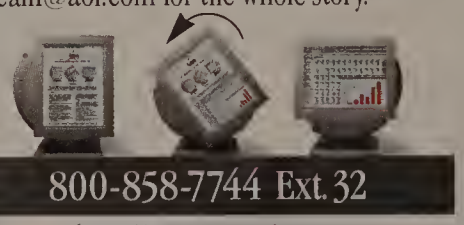

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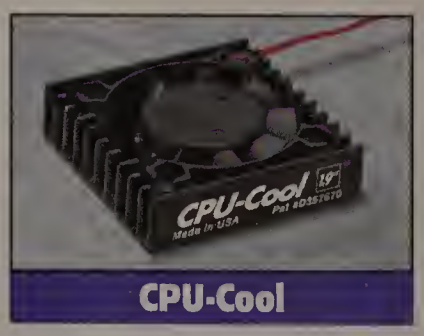

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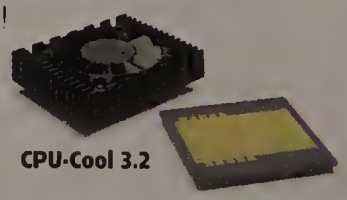

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Stacking SIMMs Isn't Simple

Q I'd like to add 8MB of memory to my 486DX2-66, but all eight of my 30-pin slots are filled with 1MB SIMMs. I've seen ads for adapters that let you put four 1MB, 30-pin SIMMs into one 30-pin SIMM slot. That would give me room to add two 4MB SIMMs. Do these adapters work?
Marc Wheeler, Henderson, Texas

A They can work, but be aware of a few problems. First, you need room. As you know, in 486 systems you must fill 30-pin SIMM sockets four at a time. The adapters hold the SIMMs on one side, which must face *away* from adjacent SIMMs in that bank of slots. In other words, a SIMM adapter must go in an *outside* SIMM slot or it won't fit. Since you're installing two adapters, you'll have to order one "back-mounted" adapter for the first slot and one "front-mounted" type for the last slot. The adapters still may not fit if a nearby power supply or other obstacle is too close to an outer slot, so check your system to make sure there's a SIMM's worth of clearance. If everything fits, the two 4MB SIMMS will go in the slots between the adapters.

Second, you must disable hidden refresh if your system has it. Hidden refresh allows a system to combine a refresh cycle with a memory read or write, but the performance boost is negligible. To turn it off, go into your CMOS setup utility and look for the hidden refresh menu item in "advanced" options. If you can't find hidden refresh, then your system doesn't have it and you don't have a problem. If you're not sure, call the PC manufacturer.

Not turned off by the hassle? SimmSaver sells a quality adapter for your purposes for $49. Just make sure all ten SIMMs and both adapters are snug in their sockets.

- **SimmSaver/30** adapter $49; SimmSaver; 316/264-2244
  Reader service no. 647

By Eric Knorr

Eric Knorr is a contributing editor for PC World *and editor and principal author of* The PC Bible *(Peachpit Press, 1995, 800/283-9444).* Hardware *welcomes your questions and pays $50 for published items.* *See page 14 for contact information.*

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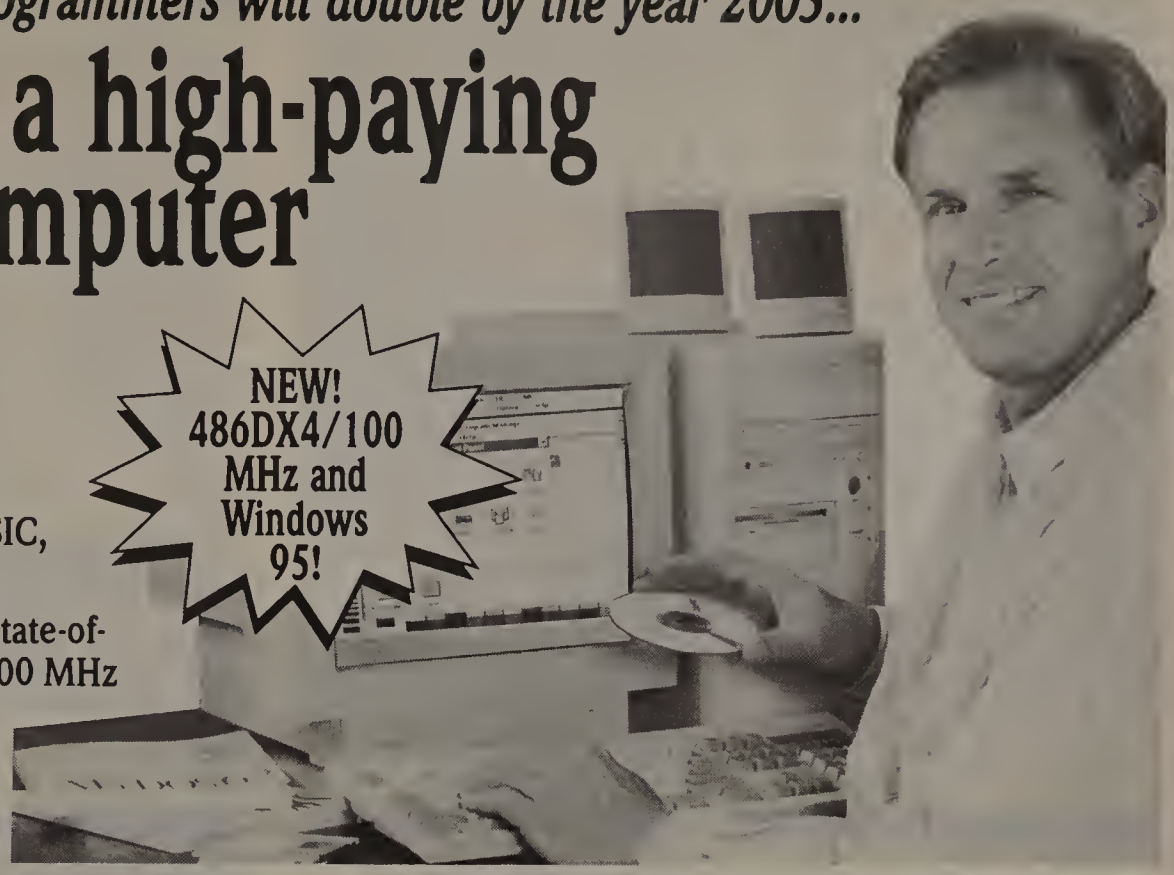

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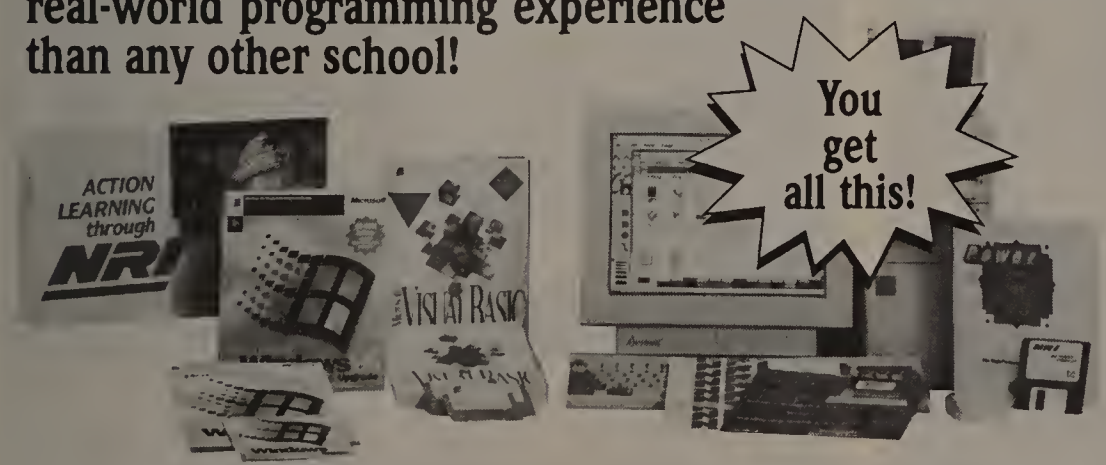

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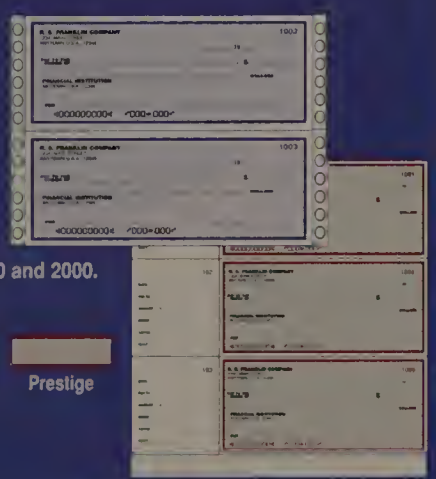

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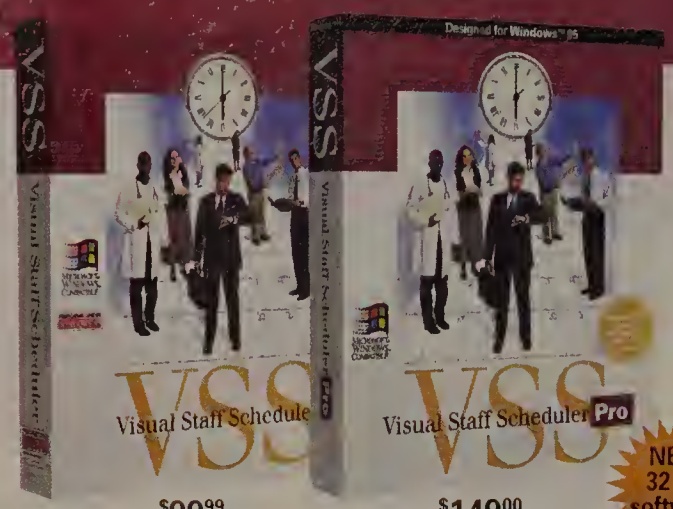

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With a "pencil and paper" scheduling system and a constantly changing work environment, staying on top of things is harder than ever. Stop using an eraser, calculator, and bottle of aspirin. Give yourself a break and switch to the timesaving convenience of VSS or VSS Pro.

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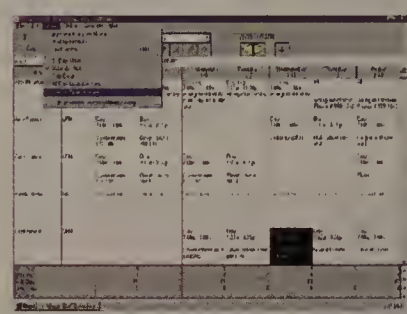
VSS Pro is the powerful and flexible way to schedule employees. VSS Pro is an easy-to-use scheduling system that lets you schedule your way. Display the desired amount of information appropriate for your needs. Set the viewer from a detailed one day view to a comprehensive 42-day view. And with "what you see is what you get" reporting, you can print schedules for any situation.

VSS is the quick and easy way to schedule employees. VSS is an excellent system that's designed to handle most scheduling needs. The system utilizes a fixed 28-day worksheet that provides a clear and comprehensive master schedule. VSS allows you to print six pre-formatted reports with custom information.



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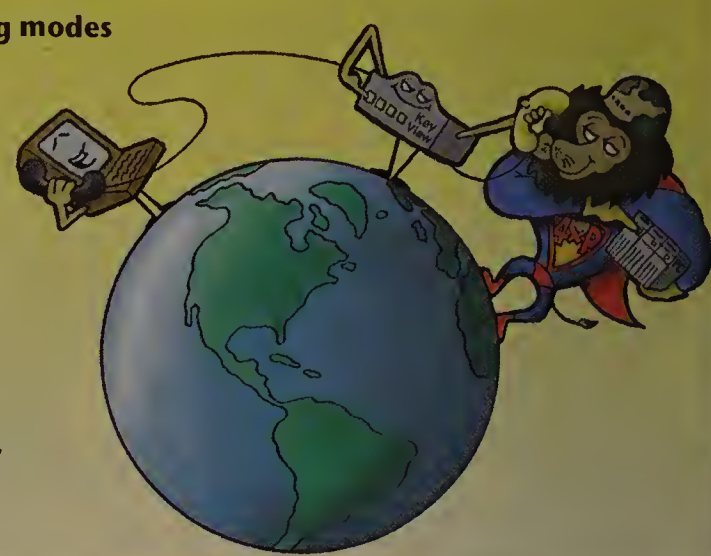

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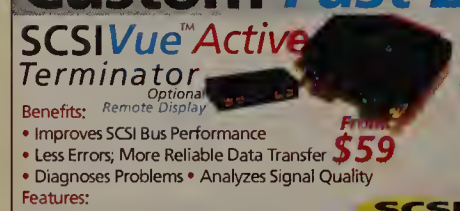

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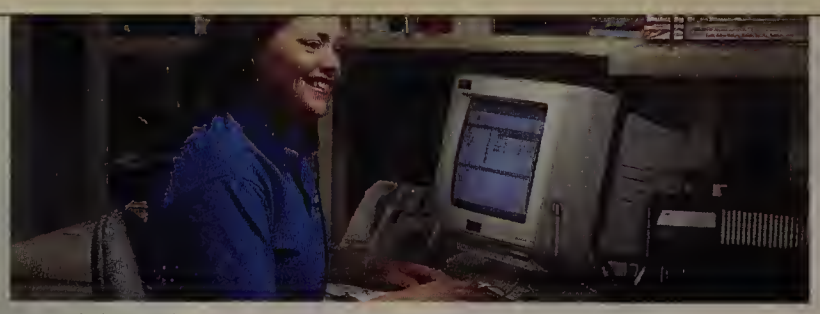

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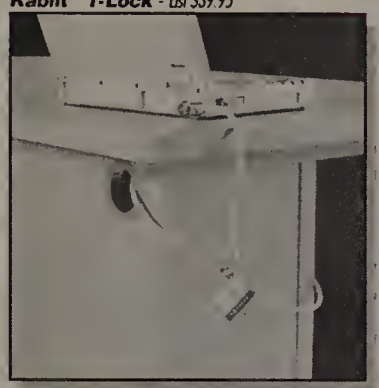

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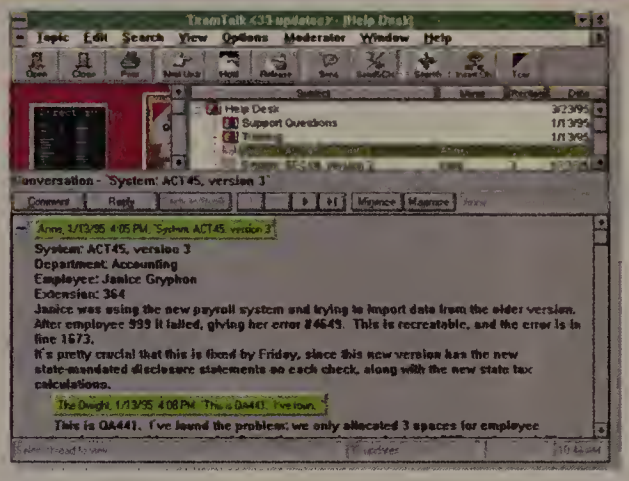

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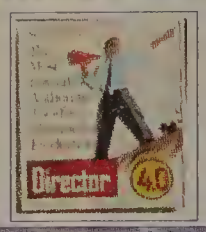

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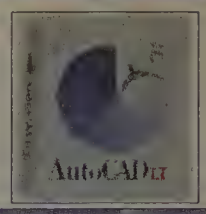

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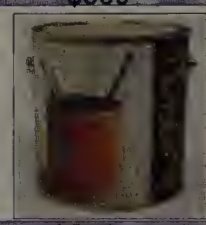

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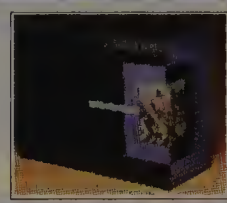

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Model	1MB	2MB	4MB	8MB
Epson AL1000, 1500:	—	$99	198	—
HP IIP, III, IIIP, IIID:	—	92	168	—
HP II, IID:	—	90	168	—
HP 3SI, 4, 4M, 4SI, XL300, DJ1200C	—	79	133	265
HP 4L:	47	—	—	—
HP DJ 500 Series (256K)	39	—	—	—
HP 4P, 4MP, Color LJ	—	79	133	—
HP 5L	—	—	152	291
OKI 400:	—	94	—	—
OKI 400E, 410E	—	112	194	—
TI ML, XL	45	—	—	—

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512K Pipeline Burst 15ns 160 pin 99

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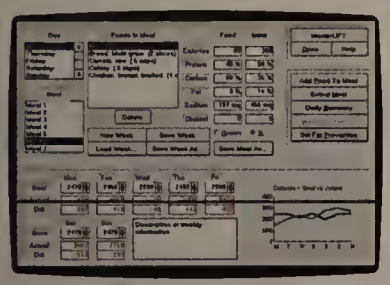

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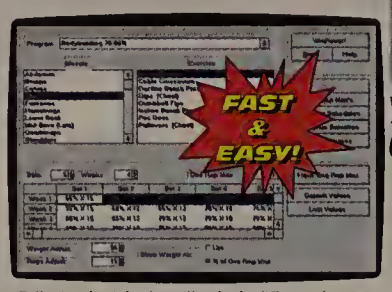

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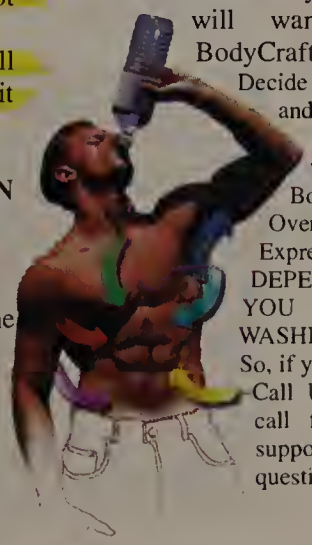

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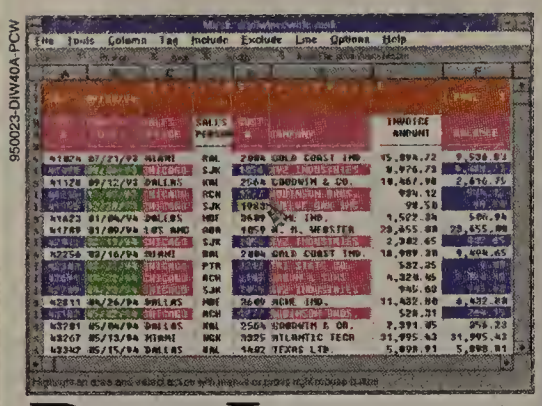

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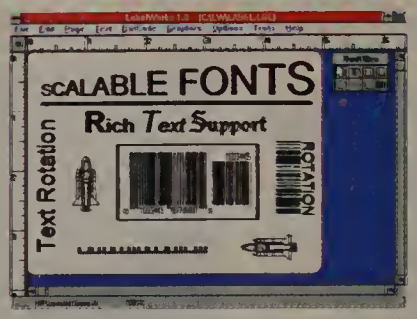

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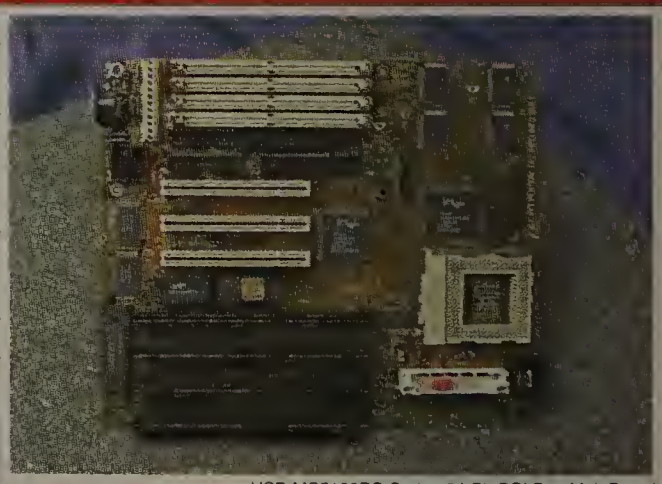

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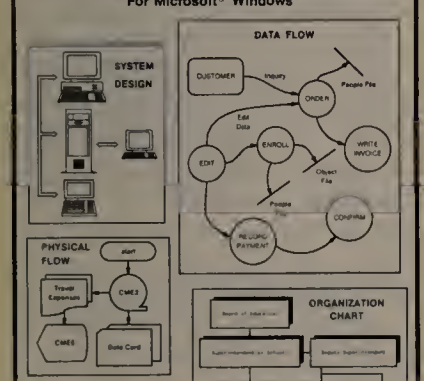

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LEGAL NOTICE

SIEGEL V. SYNCRONYS, et al.
Case No. 95 CH 12257

SUMMARY NOTICE OF CLASS ACTION AND PROPOSED SETTLEMENT

TO: ALL PERSONS WHO PURCHASED SOFTRAM OR SOFTRAM95

The purpose of this summary notice is to inform all Class Members of the proposed settlement of the lawsuit brought against Syncronys Softcorp. in the Circuit Court of Cook County, Illinois. As explained in detail in a notice of class action and proposed settlement which will be distributed by mail (the "Mailed Notice"), if you purchased SoftRAM or SoftRAM95 on or before March 15, 1996, you are a member of the Settlement Class and your rights will be affected by the legal proceedings in this action. You are encouraged to read this Notice and the Mailed Notice in their entireties. You have a right to request exclusion from the Settlement Class but you must do so by June 15, 1996 by following the procedures outlined in the Mailed Notice. If you do not request exclusion from the Settlement Class, the terms of the settlement and judgment will be binding as to you.

Generally, the proposed settlement, which has been preliminarily approved by the Court, provides that in exchange for releasing all claims against Syncronys Softcorp. and its distributors and retailers in connection with SoftRAM or SoftRAM95, Class Members may be entitled to (1) a full refund or a free software upgrade or free software, at the Class Member's election, and (2) coupons which may be used in connection with the purchase of other Syncronys products. A hearing will be held on June 24, 1996 at 10:30 a.m before the Honorable Aaron Jaffe in Courtroom #2405, Circuit Court of Cook County, Illinois to determine whether the proposed settlement, including payment of attorneys' fees, is fair, reasonable and adequate, and whether a final judgment should be entered approving it and dismissing the lawsuit against Syncronys. You may appear personally or by counsel; if you do not appear you will be represented by Class Counsel. To object, you must file a written objection, received by the Court by June 15, 1996.

IF YOU BELIEVE YOU ARE A MEMBER OF THE SETTLEMENT CLASS AND HAVE NOT RECEIVED THE MAILED NOTICE, YOU SHOULD REQUEST A COPY BY TELEPHONE (1-800-335-4059). PLEASE DO NOT CONTACT THE COURT FOR INFORMATION. ALL QUESTIONS RELATING TO THE PROPOSED SETTLEMENT SHOULD BE DIRECTED IN WRITING TO THE PLAINTIFFS' CLASS COUNSEL, LARRY D. DRURY, ESQ., 180 NORTH LA SALLE ST., #2416, CHICAGO, IL 60601, OR BEN BARNOW, ESQ., 105 W. MADISON, 22ND FLOOR, CHICAGO, IL 60602.

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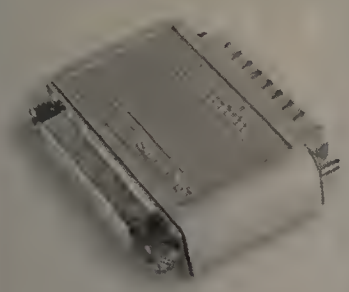

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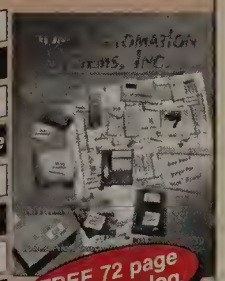

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- MPRII
- .27mm dot pitch

PanaSync S17.....$689
- 1280 x 1024 ni
- MPRII
- .27mm dot pitch
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- 1600 x 1280 ni
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75MHz	540MB	10.4" TFT	#32121†	$2669
75MHz	810MB	10.4" TFT	#32122†•	$2999
90MHz	540MB	10.4" TFT	#32123†	$2789
90MHz	810MB	10.4" TFT	#32124†	$2889
90MHz	810MB	10.4" TFT	#32125†•	$3199

† Includes 2X CD-ROM • 16MB RAM

Options & Accessories	Order #	Price
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- 28.8 Data/Fax Modem included

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90MHz	720MB	10.4" Active	#27902	$4999
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90MHz	720MB	12.1" Active	#27901	$5499
120MHz	720MB	12.1" Active	#27903	$5699
90MHz	1.2GB	12.1" Active	#27900▲	$6699

▲ Includes 4X CD-ROM

Options & Accessories	Order #	Price
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8MB Upgrade	#28347	$369.98

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75MHz	1.2GB	10.4" Active	#30707▲	$3688

▲ Includes 4X CD-ROM drive

Options & Accessories	Order #	Price
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8MB RAM Module - Extensa 560 Series	#27982	$599.98
Internal Battery, NiMH	#27986	$169.98
Battery module, Li-Ion	#27987	$279.98
Auto Adapter	#27991	$149.98

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#23481	HP DeskJet 660C	$349.98
#27969	HP DeskJet 340	$289.98

Order #	Description	Price
#88901	HP 600 Color Kit	$42.98
#13695	HP High Capacity Black Ink	$26.98
#27142	DeskJet High Capacity Black Ink - 2 Refills	$14.98
#27143	DeskJet Black Ink - 2 Refills	$9.98
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Desktop (C)	133MHz	1.6GB	#32153■	$1959
Minitower (C)	120MHz	1.0GB	#32154•■	$2079
Minitower (C)	133MHz	1.6GB	#32155•■	$2289
Minitower (C)	150MHz	2.0GB	#30714•■	$2469
Minitower (C)	166MHz	2.0GB	#30715•■	$2779
Minitower (C)	166MHz	2.5GB	#30716••	$2989

•16MB RAM (C - Charcoal chassis) ▲Includes 4X CD-ROM
■Includes 6X CD-ROM •Includes 8X CD-ROM

Multimedia Color Monitors (Charcoal)	Order #	Price
Acer Aspire 33s, 14" (13.1 View) .28ni 640x480	#28038	$299.98
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Desktop 330	P90	850MB	#26522•	$2039
Desktop 350	P100	850MB	#27916•▲	$2299
Desktop 350	P100	850MB	#27917•	$2129
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Desktop	P100	1.2GB	#32158•	$2359
Desktop	P133	1.2GB	#32159•	$2569
Desktop	P133	1.6GB	#32160•	$2749
Desktop	P166	1.6GB	#32161•▲	$3399
Minitower	P100	1.2GB	#32162•	$2399
Minitower	P133	1.6GB	#32163•▲	$2979
Minitower	P166	1.6GB	#32164•▲	$3459

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•16MB RAM

Options & Accessories	Order #	Price
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Lithium Ion battery pack	#29976	$329.98
Optional 4X CD-ROM Drive	#28685	$329.98
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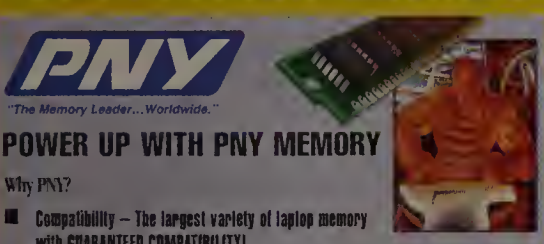

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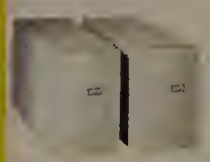

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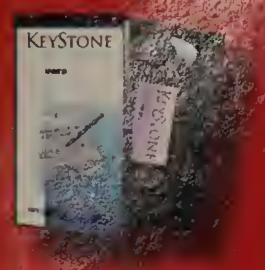

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Project 4.0/4.1 - Level 1-4	(ea) $79.95
Publisher 2.0 - Basics/Power Tools	(ea) $49.95
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SMS Server 1.0 - Level 1/2/3	(ea) $89.95
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Works 3.0 - 2 videos	(ea) $49.95

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Approach 3.0 - Beg/Int/Adv	(ea) $49.95
Freelance 2.0, Beg/Int/Adv	(ea) $49.95
Organizer 1.1/2.0	$49.95
Word Pro 96 - Beg/Int/Adv	(ea) $49.95

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GroupWise 4.1 - User Level 1/2	(ea) $49.95
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Netware 4.1 - Level 1-7	(ea) $89.95
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Presentations 3.0 - Beg/Int/Adv	(ea) $49.95
Duotto Pro 5.0/6.0 Beg/Int/Adv	(ea) $49.95
WordPerfect 6.0 - Beg/Int/Adv	(ea) $49.95

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CorelDrow 4/5 - Beg/Int/Adv	(ea) $49.95
DotaCAD - Beg/Int/Adv	(ea) $79.95
dBase 5.0 - Beg/Int/Adv	(ea) $49.95
Harvard Graphics 3.0 - Beg/Int/Adv	(ea) $49.95
PageMoker 5.0 - Beg/Int/Adv	(ea) $49.95
Poradox 4.5/5.0 - Beg/Int/Adv	(ea) $49.95
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- 3 PowerPoint 4.0, 1 MS Mail training videos
- 13 videos with over 24 hours of training

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CTX

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17" 1785GME-1 ....$739
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PANASONIC

15" PanaSync C1591E $389
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17" PanaSync S17 ....$699
17" PanaSyncC 1792P $849
21" PanaSync C2192P $1679

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10Base-T w/X Jack $319
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10Base-T w/cable connector $429
10Base-T and 10Base-2 w/X Jack connector $449
10Base-T and 10Base-2 w/cable connector $449
PC Card 1Cellular Capable Modems
14.4 data/fax w/X Jack connector $118
14.4 data/fax w/cableconnector $118
28.8/14.4 data/fax w/X Jack connector $229
28.8/14.4 data/fax w/X Jack connector $229

PRACTICAL PERIPHERALS

14.4/14.4 Data/Fax int/ext ....$65/$79
V.34 28.8/14.4 Data/Fax int/ext ....$155/$169
ProClass PC Card 14.4/14.4 ....$149
ProClass PC Card 14.4/14.4
w/EZ Pact retractable connector $149
ProClass PC Card 28.8/14.4 ....$279
ProClass PC Card 28.8/14.4
w/EZ Pact retractable RJ-11connector $279

HAYES

PC Card Optima 14.4+FAX with EZJack™ $165
PC Card Optima 28.8 V.34 +FAX 14.4 with EZJack™ $239
ACCURA 144+FAX144 in/ext ....$79/$89
ACCURA 288V.FC+FAX int/ext ....$169/$199
OPTIMA 14.4 Business modem w/Voice Mail Ext. $369
OPTIMA 28.8 Business modem w/Voice Mail Ext. $429
OPTIMA 288 V.FC+FAX int/ext ....$369/$429
ESP Communications Accelerator $75

US ROBOTICS

Sportster 14.4 Data/Fax Plug-n-Play Int/Ext ....$91/$107
Sportster 14.4 PC Card $95
Sportster 28.8 Plug-n-Play Int/Extt ....$185/$199
Sportster Voice 28.8/14.4 w/Voice Mail $215
Sportster Vi 28.8 DSVD $279
Sportster Vi 28.8 Plug-n-Play w/Voice Mail Int/Ext $195/$219
Sportster 28.8 PC Card Plug-n-Play w/Data View $289

Printers...Laser/Ink Jet/Dot Matrix

HP PRINTERS

HP DeskJet 340 Printer $279
HP DeskJet 600/660C/850C Printer ....$229/$339/$489
HP DeskJet 1600C /CM Printer ....$1299/$1899
HP LaserJet 5L-F5/5P Printer ....$489/$849
HP DfficeJet Printer/Fax/Copier Value Pack $509
HP Fax 700 Fax/Copier Value Pack $499

EPSON

LX300 ....$169
LQ-570+/1070+ ....$245/$385
FX-870/1170/2170 ....$289/$379/$499
LQ-870/2170 ....$447/$599
DFX-5000+/8000 ....$1395/$2329
Stylus Color II $339
Stylus Color IIs $239
Stylus Pro $599
NEW Stylus 1500 ....$995
Stylus Pro XL $1799

BROTHER

HL-630 ....$349
WL-660 ....WHILE SUPPLIE LAST....$399
HL-960/HL1260 ....$989/$1219
MFC-4500 ML/MFC-4000 ML ....$959/$885

OKIDATA PRINTERS

DL600e $399
OL610e $519
OL810E $799
ML320/ML321 ....$319/$449
ML590/ML591 ....$449/$609
Okijet 2010 ....$339

CANON

BJC210/610 ....$239/$469
BJ-30/230 ....$257/$384
BJC-70 ....$354
BJC-4100 ....$329

TI PRINTERS

microLaser WIN/4 ....$379
microLaser 600 ....$854
microLaser PowerPro/12 ....$1199

LEXMARK

Winwriter 150C $315
Color Jetprinter 1020 ....$219
Color Jetprinter 2070 ....$499
Optra E $569
4039 10Plus $1129
Optra R+/OptraRt+ ....$1449/$1649
Optra Lx+ $2249
Optra Lxi+ $2929
Optra C Color Laser $6089

PANASONIC PRINTERS

KX-P6100 ....$369
KX-P6500 ....$419
KX-P1150/P2023 ....$129/$179
KX-P3124 ....$315
KX-P3626 ....$389

Multimedia / CD ROM

NEC

MultiSpin 4Xc 4 Disk Changer $269
MultiSpin 4Xc 7 Disk Changer $339
MultiSpin 6Xi $339
MultiSpin 6Xe $489

CREATIVE LABS

Blaster CD 6X PnP $189
Sound Blaster Value CD 4X $299
Discovery CD 4X PNP $279
SoundBlaster Performance 6X PnP $449
SoundBlaster 16 Value IDE PnP $99
SoundBlaster AWE 32 PnP $229
SoundBlaster 32 PnP $159
Advanced Signal Proc Upgrade Kit $55
Wave Blaster II $119

PLEXTOR

PX-63CX 6X CD-ROM $459
PX-65CS 6X CD-ROM External $539

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Panasonic Ext. 4X CD-ROM Drive $329
Panasonic Portable 4X CD-ROM Drive $389
Panasonic Portable 4X CD-ROM Drive w/Sound $599

DIAMOND

Multimedia Kit 8000 ....$499

SONY

CSS-8100 Speakers $69
SRS-PC40 Speakers $75
SRS-PC91 ....$139
SRS-PC300D Speakers $199
CSD 760E (Quad Speed) CD-ROM $175
CSD 760S (Quad SCSI) CD-ROM $285
PRO 150 Portable CD-ROM $345

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FREE SOFTWARE!

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HP ScanJet 4C Scanner (color) $949
NEW HP ScanJet 4P Scanner (color/greyscale) $499

MICROTEK

Scanmaker E3 ....$379
PageWiz $199

EPSON

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410CS features Intel Pentium 90MHz processor, 11.3" Color Dual Scan Display, 810MB HD, 8MB RAM (Max. 40MB) Includes DOS/Win 3.11. ....$2899
410CDT features Intel Pentium 90MHz processor, 11.3" Color Active Matrix Display, 810MB HD, 8MB RAM (Max. 40MB), CD-ROM Drive. Includes DOS/Wins 3.11 ....$4099

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610CT features Intel Pentium 90MHz processor, 9.5" Color Active Matrix Display, 720MB HD, 8MB RAM (Max. 40MB) Includes Wins 95. ....$3599

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700CT features Intel Pentium 120MHz processor, 11.3" Color Active Matrix Display, 1.2GB HD, 16MB RAM (Max. 48MB). Includes Win 95. ....$5599

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Satellite 100CS Pentium 75, Dual Scan, 528MB $1999
Satellite T2130CS DX4-75, Dual Scan, 520MB $1598
Satellite Pro 410CS, Pentium 90, Dual Scan, 810MB $3199
Satellite Pro 410CT Pentium 90, Act. Color, 810MB $4399
Portege 610CT, Pentium 90, Active Color, 720MB $3889
Tecra 700CS, Pentium 120, Dual Scan, 1.2GB $4699
Tecra 700CDT, Pentium 120, Active Color, 1.2GB $5999
NEW Tecra 720CDT Pentium 133, 12.1 Active Color, 1.2GB,
6x CD-ROM, 28.8 Modem $7549

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600C DX4-75, 8.5", Dual Scan 340MB $2129
600CT DX4-75, 9.5", Active 340MB $2399
5000C Pentium 75, 10.4" Dual Scan, 810MB $2949
5000C Pentium 90, 10.4" Dual Scan, 810MB $3349
5000CS Pentium 90, 10.4" Active, 810MB $4479

NEC

VERSA 4000C Pentium 75 Active Color 810MB 4X CD-ROM $3799
VERSA 4050C Pentium 90 Active Color 810MB 4X CD-ROM $4499
VERSA 4050H Pentium 90 Hi-Res Color 810MB $4499
VERSA 4080H Pentium 120 Hi-Res Color 1.0GB $4999
VERSA 5500 Sx86-100MHz, 10.4" Dual Scan, 540MB $1799
VERSA 2200C Pentium 75, 9.5" Active Color 810MB $2449
VERSA 2205C Pent. 75, 9.5" Active Color 810MB, 14.4 Modem $2499

IBM ThinkPad

701CS DX4-75,10.4" Dual Scan 720MB ....While Supplies Last....$1679
701C DX4-75, 10.4" Color Active 540MB $2039
701C DX4-75 10.4 Color Active 720MB $2179
760C Pentium 90, 12.1" Black Active 720MB $5499
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760LD Pentium 90, 10.4" Color Active 810MB ....Call

TEXAS INSTRUMENTS

EXTENSA 450 DX4-75, 10.4"Dual Scan 340MB $1449
EXTENSA 450T DX4-75, 9.5"Active 340MB $1929
EXTENSA 550 Pentium 75, 10.4" Dual Scan 524MB $1929
EXTENSA 550CD Pentium 75, 10.4" Dual Scan 524MB $2899
EXTENSA 550CDT Pentium 75, 10.4" Active 524MB $3469
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EXTENSA 560CDT Pentium 75, 10.4" Active 1.2GB $3699
TI5000 Pentium 75, 10.5" Dual Scan 524 MB $2349
TI5000 Pentium 75, 10.4" Active Color 810 MB $2939
TI5100 Pentium 90, 10.4" Active Color 1.2GB $3379
TI5100 Pentium 90, 10.4" SVGA Color 1.2GB $3699
TI5200 Pentium 120, 10.4" Active Color 1.2GB $4649

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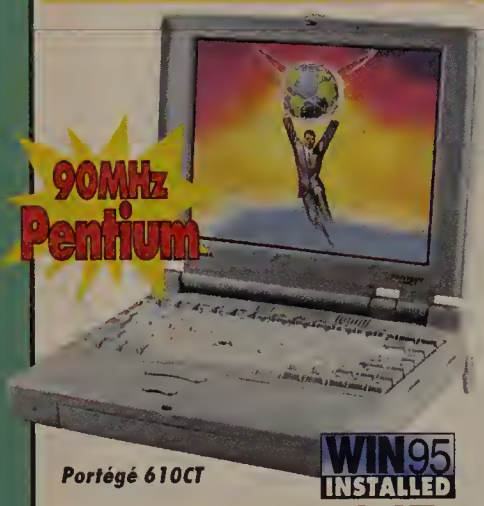

Portégé 610CT

Portégé 610CT

- Pentium 90MHz processor
- 9.5" True Color display for optimum color
- Built-in 16-bit sound (SoundBlaster Pro compatible), microphone & speaker
- Lithium Ion battery technology
- Integrated Accupoint for easy control

Processor	Screen	RAM/HD	Price
Pentium 90MHz	9.5" True Calar	8/720MB	$3939

Built-In CD-ROM 6X Speed!

Tecra 700 and 720

- Pentium 120MHz & 133MHz processors
- PCI bus architecture (internal & external)
- 11.3", 800x600 high res. display (Tecra 700)
- 12.1", 1024x768 high res. display (Tecra 720)
- Built-in 28.8 fax/modem with speaker phone (Tecra 720 models only)
- Built-in 6X CD-ROM Drive (Tecra 720)
- Optional 4X CD-ROM Drive (Tecra 700)

Processor	Screen	RAM/HD	Price
Pentium 120	11.3" Dual Scan SVGA	8MB/1.13GB	$4679
Pentium 120	11.3" Active SVGA	16MB/1.13GB	5949
Pentium 133	12.1" Active SVGA	16MB/1.2GB	7469

Tecra 720

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Satellite Pro 410CT

Satellite Pro 410

- Built-in 4X CD-ROM Drive (Swap floppy & CD-ROM) (Active model only - optional on Dual Scan)
- Built-in 16-bit sound, microphone, speaker & MIDI
- EDO RAM memory, expandable to 40MB
- Built-in AC adapter - small, sleek design & reduced weight
- Integrated Accupoint - small, accurate & easy to use
- Lithium Ion battery technology
- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
Pentium 90	11.3" Dual Scan SVGA	8/772MB	$3199
Pentium 90	11.3" Active SVGA	8/772MB	4399

Satellite 2130CS/100CS

Satellite 2130CS/100CS

Processor	Screen	RAM/HD	Price
486DX4/75	10.4" Dual Scan	8/500MB	$1599
Pentium 75	10.4" Dual Scan	8/500MB	1969*

*EDO RAM

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ThinkPad® 760LD

ThinkPad® 760L and 760LD

- 10.4" Active display
- 32-bit accelerated Local bus video
- Built-in sound card, speakers & mic.
- 256KB Level 2 cache
- New tilting keyboard with palm rest

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8/810MB	$4249
Pentium 90	10.4" Active	8/810MB	4549*

* Includes built-in 4X CD-ROM drive
Windows 95 models also available

ThinkPad® 760

- Up to 120MHz Pentium with 32-bit Local bus
- 12.1" Active displays with 800x600 resolution (selected models)
- 4X CD-ROM Drive, MPEG-2 support, & full motion video (ThinkPad760CD models only *)
- Built-in 28.8 fax/modem
- SoundBlaster-compatible audio & telephony
- Lithium Ion battery technology

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active	8/720MB	$4999
Pentium 90	12.1" Active	8/720MB	5499
Pentium 120	12.1" Active	8/720MB	5699
Pentium 120	12.1" Active	8MB/1.0GB	5999
Pentium 90	12.1" Active	8MB/1.2GB	6699*
Pentium 120	12.1" Active	8MB/1.2GB	6899*

ThinkPad® 760

*Features built-in 4X CD-ROM drive
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Built-In CD-ROM

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Processor	Screen	RAM/HD	Price
Pentium 75	10.1" Active	8/810MB	$3799†
Pentium 90	10.4" High Res.	8/810MB	4499
Pentium 90	10.1" Active	8/810MB	4499†
Pentium 120	10.4" High Res.	8MB/1GB	4999

† Features built-in 4X CD-ROM drive

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Processor	Screen	RAM/HD	Price
Pentium 100	11.3" Dual Scan SVGA	8MB/800MB	$3300
Pentium 100	11.3" Dual Scan SVGA	8MB/1.2GB	3780
Pentium 133	11.3" Active SVGA	8MB/800MB	4250
Pentium 133	11.3" Active SVGA	8MB/1.2GB	4730

AST Ascentia J

- Integrated 14.4/14.4 Data/fax modem
- PCI bus architecture with 256KB L2 cache memory
- 10.4" SVGA (800x600) resolution Dual Scan and Active displays

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan SVGA	8/500MB	$2450
Pentium 100	10.4" Dual Scan SVGA	8/800MB	2840
Pentium 100	10.4" Active Matrix SVGA	8/800MB	3120

COMPAQ

Contura 430

Processor	Screen	RAM/HD	Price
486DX4/100	10.4" Dual Scan	8/720MB	$2369
486DX4/100	10.4" Active	8/720MB	2939

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- 32-bit PCI Local bus graphics
- 8MB RAM exp. to 72MB
- Built-in 16-bit sound, microphone & **2 speakers**
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- Up to 1.35GB hard drives (2.7GB max. capacity)
- Built-in infrared for wireless communications
- Supports NiMH batteries
- Optional MPEG and TV video adapter

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Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	8/510MB	$3799
Pentium 75	11.3" Dual Scan	8/810MB	4439
Pentium 75	10.4" Active	8/810MB	4729
Pentium 90	10.4" Active	8/810MB	5339
Pentium 90	10.4" Active	8/810MB	5599*
Pentium 120	10.4" Active	8MB/1.35GB	6149

*Features Built-in CD-ROM drive

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LTE 5000

TEXAS INSTRUMENTS

Extensa 560

Extensa 560CD/560CDT

- 75MHz Pentium w/PCI bus & 256KB cache
- Built-in 4X CD-ROM drive
- Built-in 16-bit sound, microphone & speaker
- Integrated Touchpad pointer
- 10.4" Active Matrix & 10.4" Dual Scan
- Built-in infrared for wireless communications

Processor	Screen	RAM/HD	Price
Pentium 75	10.4" Dual Scan	810MB	$2749
Pentium 75	10.4" Active	1.2GB	3699

TravelMate 5130/5270/5300

Processor	Screen	RAM/HD	Price
Pentium 90	10.4" Active SVGA	8MB/1.2GB	$3699*
Pentium 120	11.3" Active SVGA	8MB/1.2GB	4700*
Pentium 133	11.3" Active SVGA	8MB/1.2GB	5390*

*SVGA-800 x 600 resolution

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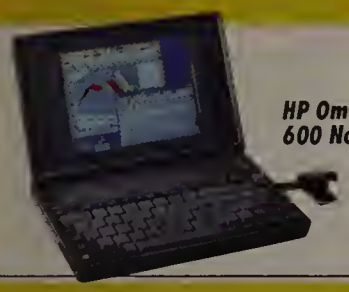

HP OmniBook 600 NoteBook PC

HP OmniBook 600

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- Built-in infrared for wireless communications
- Lithium Ion battery technology (Active model only)
- Instant "ON" ready-to-work state – lasts for months on a charge

Processor	Screen	RAM/HD	Price
486DX4/75	8.5" Dual Scan	8/340MB	$2200
486DX4/75	9.5" Active	8/340MB	2500

HP OmniBook 5500

- 133MHz Pentium with 32-bit PCI Local bus
- 12.1" Active Matrix display with 65,000 colors
- Super VGA-800x600 resolution on notebook
- PCI Local bus Video, 1.5MB video memory
- Instant "ON" capabilities
- Optional 4X CD-ROM available

Processor	Screen	RAM/HD	Price
Pentium 133	12.1" Active	8MB/1.35GB	CALL

HP OmniBook 5500 NoteBook PC

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HP DeskJet 340 CV (bundle) C2664A	329.99†
HP DeskJet 320 (bundle) C2637A#ABA	229.00†
HP DeskJet 600 printer C2184A	239.99
HP DeskJet 600C printer C4547A	259.99†
HP DeskJet 660C printer C2164A	359.99†
HP DeskJet 660Cse printer C4548A	369.99*†
HP DeskJet 855C printer C4551A	498.99*†
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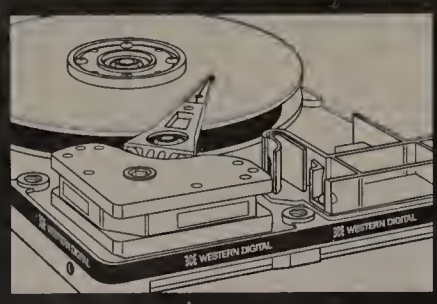

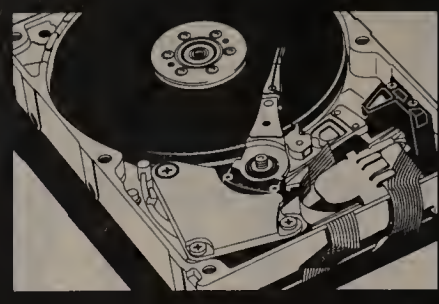

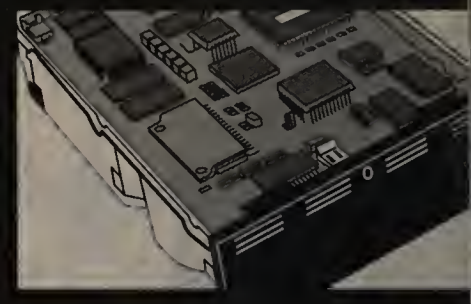

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SyQuest 270MB	$59	$56	$54	$53	$52

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4294MB	8ms	MC3243AV	$1025
9100MB	12ms	MC1991AV	$2029
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1625MB	10ms	ST31640A	$295
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4290MB	8ms	ST15150N	$1129
9080MB	11ms	ST410800N	$1989
WIDE SCSI			
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4290MB	8ms	ST15150W	$1199
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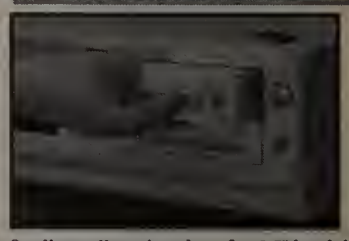

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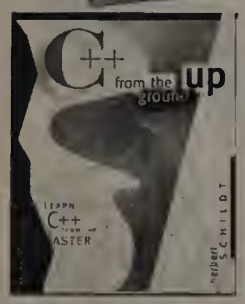

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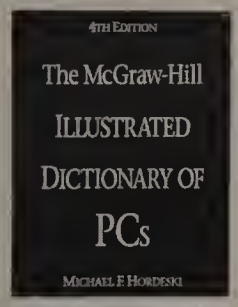

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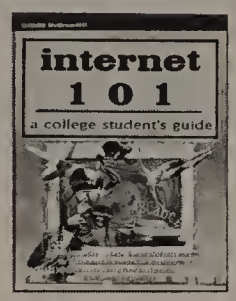

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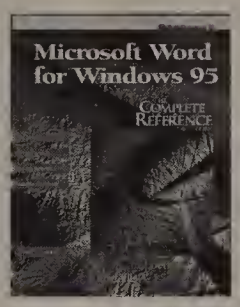

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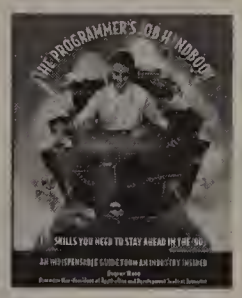

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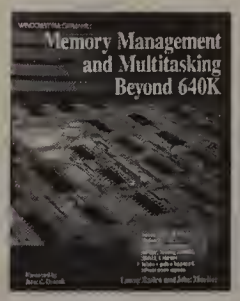

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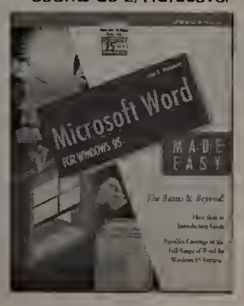

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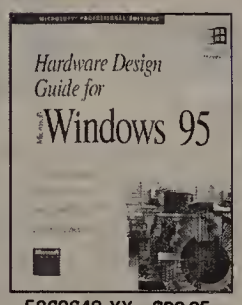

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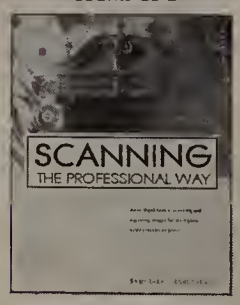

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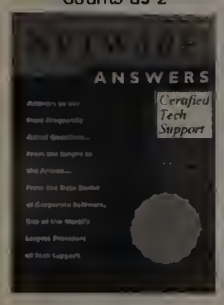

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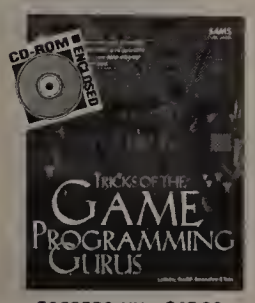

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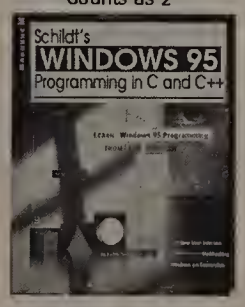

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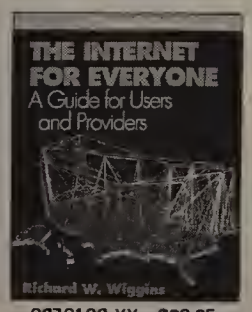

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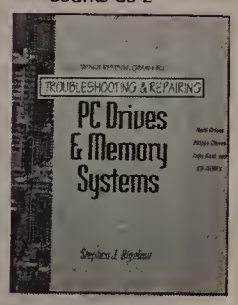

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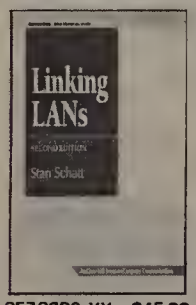

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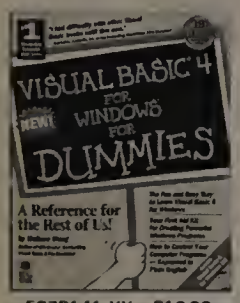

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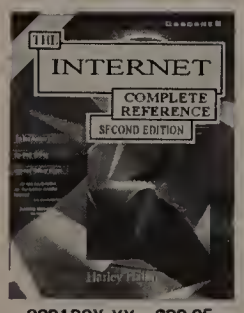

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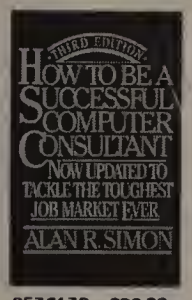

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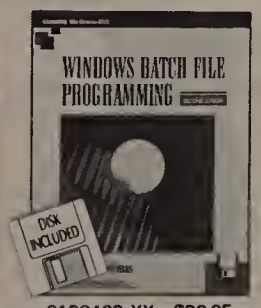

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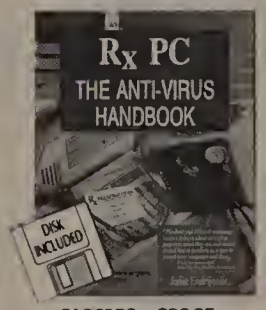

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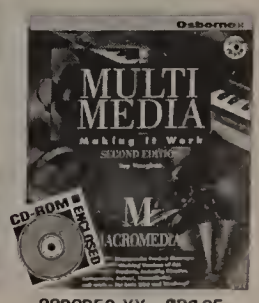

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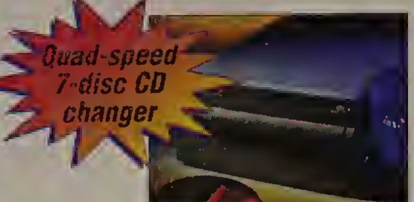

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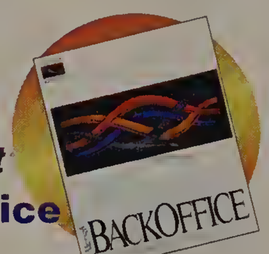

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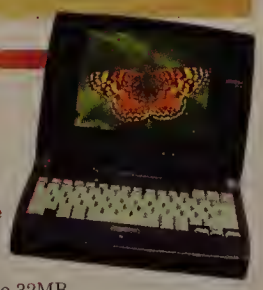

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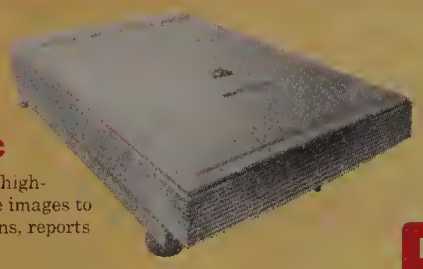

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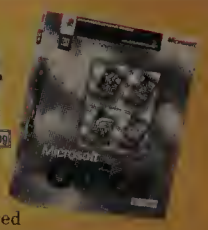

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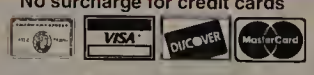

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1GB Fast SCSI-2	371.34
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Caviar 1GB EIDE	237.27
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CONTROLLERS

Acculogic SIDE-3+ w/on-board BIOS	48.90
Acculogic SIDE-4+ w/par, 2ser, game	35.06
Acculogic SIDE-4VL EIDE, 16550 serial	89.76
Adaptec 1542CP SCSI Master Kit	259.73
Adaptec AVA1505 SCSI-2 CD Kit	54.95
Adaptec 2842 VLB SCSI-2	249.83
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MODEMS & COMMUNICATIONS

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V.34 28.8 internal w/fax	157.33
V.34 28.8 external w/fax	205.00

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ACCURA 144 internal w/fax	77.44
ACCURA 144 external w/fax	89.35
ACCURA 288 V.34 internal w/fax	167.64
ACCURA 288 V.34 external w/fax	189.70
OPTIMA 144 external w/fax	374.30
OPTIMA 288 V.34 internal w/fax	365.14
OPTIMA 288 V.34 external w/fax	419.44
OPTIMA 288 Business Modem	433.23

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14.4 Mini Tower w/fax	77.44
V.34 28.8 internal w/fax	152.40
V.34 28.8 Mini Tower w/fax	169.44

MICROCOM

Deskporte Fast ES V.34 28.8	179.94
DeskPorte 28.8P V.34	229.85

MODEMS & COMMUNICATIONS

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Lifestyle 28.8 int. w/fax, Caller I.D.	187.20
Lifestyle 28.8 ext. w/fax, Caller I.D.	196.38
Power 28.8 ext. w/fax, Caller I.D., flash ROM	256.49
BitSURFR Pro ISDN terminal adapter	349.84

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SatisFAXtion 400, internal	288.64
SatisFAXtion 400e, external	324.89

U.S. Robotics

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28.8K V.34 external w/fax	199.86
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Vi 14.4K external w/fax & voice	128.89
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Vi 28.8K V.34 external w/fax & voice	217.14
Vi DSVD V.34 internal w/fax & voice	278.82

COURIER MODEMS

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V.34 external w/fax	369.98

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Megahertz XJack Gold 14.4 data/fax	79.56
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32Kx8 (3.3V)	–	14 00	9 50	–
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64Kx4	–	11.00	9 00	8.00
64Kx8	–	15 00 (5V)	19.00 (3 3V)	–
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256x4(Page Dip)	–	7 25	6.75	6 50	5 95
256 4(Static Dip)	–	–	9.95	–	–
256x4(Page Zip)	–	9.25	9.00	8 95	–
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64x4	–	–	–	3 75	–
64x1	–	–	–	–	2 00
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	16Meg	500987-004	334.00
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	16 Meg	501340-002	358.00
	32 Meg	500987-005	699.00
	64 Meg	501569-001	Call
Premmia 4133, 4133S, 4/50d, 4/60d	8 Meg	501159-002	218 00
Premmia SE 4/33, 4/66d, P/60	16 Meg	501159-003	3[illegible].00
Premmia MTE 4/33, 4/66d, P/60	32 Meg	501159-004	718 00
Manhattan G, V Series Server	64 Meg	501159-005	1398.00
Power Premium 3/33, 4/33, 4/33S, 4/50d, 4/66d	8Meg	500780-001	338.00
Premium 486/25, 486/25E, 486/33, 486/33E			
Premium 386/33TE, 486/25TE, 486/33TE			
Prem II 386/25, 386/33, 486/33, 486 SX/20			
Bravo 486/25, 486/33	2 Meg Kit	S00780-005	98.00
Advantage 486/25, 486/33, 486/33P, 486 SX/20			
Premium SE4/22	8Meg Kit	500780-001	338.00
Premium SE 4/50, d, 66d, P/60	1 Meg	500780-003	49 00
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6451060 (4Meg)	80-A21, A-61, 80-A31, 80-111, 80-311	169.00
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6450608 (2Meg)	70-A21, A-61, B-21, B-61, 35SX, 35LS, 40SX, Val Pt. 325T	69.00
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92G7259 (4Meg)	Thinkpad 701C, CS, Butterfly	139 00
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Prolinea 450, 466, 4100, 575, 590, 5120, 575, 590, 5120 575 mini, 5100 mini, 5133 mini	4/8/16/32Meg	109/209/349/699
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Contura 320, 325	2Meg	139497-001	89 00
	4Meg	139498-001	149 00
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Contura 400, 410	4Meg/8Meg/16Meg		139/269/529
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Contura 4/25, 4/25C, 4/25CX	4Meg	146520-001	139.00
	8Meg	146521-001	269.00
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T2100, 2105, 2150, 2155, 2110, 2115	4Meg/8Meg/16Meg/24 Meg		164/299/569/899
T4400SX, SXC T6400, T6600	4Meg	PC-PA2004U	189 00
T4400SX, SXC T6400, T6600	8Meg	PC-PA2005U	379 00
T4400SX, SXC T6400, T6600	16Meg	PC-PA2010U	689 00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3 3 v)	4Meg	PC-PA2012U	1S7.00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3 3 v)	8Meg	PC-PA2013U	289 00
T4500, C, T4600, T4700, T1900, C, T1910, T1950 (3 3 v)	16Meg	PC-PA2014U	569.00
T4700, 4800, 4850 (Hard Drive)	524Meg/710Meg/1.3 Gig		739/969/1119
T3400CT, T2400, T3600	4Meg/8Meg/16Meg	PC-PA2019U	179/349/619
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T3100SX, T3200SX	2Meg	PC15-PA8308U	109.00
T3100SX, T3200SX	4Meg	PC1S-PA8310U	189.00
T600, 610, CT	8Meg/16Meg/32Meg		299/S85/1159
T700	8Meg/16Meg/32Meg		349/649/1299
T400CS, 400CDT	8Meg/16Meg/32Meg		299/585/1159

NOTEBOOK, LAPTOP MEMORY

MODEL	AMT. UPGRADED	MANU. PART #	PRICE
ACER 730, 735C, 760, 780	2Meg/4Meg/8Meg		89/139/268
ACER 763, 765, 782, 784, 788, 787,	4Meg/8Meg/16Meg		139/268/524
ACER 750	4Meg/8Meg/16Meg		139/268/524
ACER Note Pro, ACER Note Lite	4Meg/8Meg/16Meg		139/268/524
AST Ascentia 900N, 800N	4Meg/8Meg/16Meg		139/268/524
AST Ascentia 950	8Meg/18Meg		289/534
AST Bravo & Explorer	4Meg/16Meg	501255-001, -002	139/534
AST Notebook Prem Exec 386SX/20/25/25L	4Meg	500814-003	139 00
AST Power Exec 3/25C, 425EL, 425SL	4Meg/16Meg	S01166-001, -003	139/619
AST Power Exec 4/33SL	4Meg/16Meg	501318-001,002	149/519
AT&T Globalyst 130 *(Call for other Globalyst)*	4Meg/8Meg/16Meg		139/289/534
AT&T Globalyst 200	4Meg/8Meg/16Meg		139/289/534
AT&T Safari NSX/20	4Meg	PEC 37651	219 00
Austin DX4, DX2, SX2, SX Series	4Meg/16Meg		139/539
Bondwell B310, Plus	1Meg	23050-09100	59 00
Bondwell B310V, SX	4Meg		206
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Canon Innova 486-10	4Meg/16Meg		139/549
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Dell Lettitude XP, 475, 4100, 4100CX	4Meg/16Meg		139/549
Dell Latitude 486, 425, 433C, 433CX, 450, 450CX	4 Meg/16 Meg		139/549
Epson ActionNote 650, 650c, 660c, 660cx	4Meg/8Meg/16Meg		139/289/549
Epson ActionNote 700, 700c, 700cx	4Meg/16Meg		139/549
Epson ActionNote 800, 880, 866c	4Meg/8Meg/16Meg/20Meg		139/289/549/699
Epson ActionNote 890	4Meg/8Meg/16Meg		139/289/549
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HP Omnibook 5000	8Meg/16Meg/32Meg		289/549/1199
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Midwest Micro Elite Sndbk SX33, DX3-50, DX4-75, DX4-100	4Meg/8Meg/16Meg		149/289/549
Midwest Micro Elite Sndbk Plus D5-75, D5-90	4Meg/8Meg/16Meg		149/289/549
NCR Safari 3180, 3181	4Meg/ 8 Meg		159/299
NEC Ultralite Versa, E, V, MP	4 Meg/8Meg/16Meg/20Meg	DP4104	149/319/579/699
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NEC Versa 4000	4/8/16/32Meg		139/289/549/1199
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Canon LBP 860	–	–	–	69	–	–	99	–	–	199	359	699
Canon LBP4, 4Lite, 4plus	–	–	129	179	–	–	–	–	–	–	–	–
Epson 6000, Action Laser	–	–	–	129	–	–	229	–	–	–	–	–
Epson Action Laser 1100, 1600	–	–	69	70	–	–	99	–	–	199	359	–
Epson Action Laser II	–	–	74	–	173	–	–	272	–	–	–	–
Epson 8000, 1800, 4000, 4100, 4300	–	–	89	–	173	–	–	272	–	Call	Call	Call
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HP 2, 2D–	–	–	–	79	–	–	119	–	–	–	–	–
HP 3, 3D, 3P, 2P 2P+	–	–	–	79	–	–	119	–	–	–	–	–
HP 4, 4M, 4SI, 4SIMX	–	–	–	59	–	–	109	–	–	209	–	–
HP 4P, 4PLUS, 4MPm 1600, 1600CM	–	–	–	–	–	–	89	–	–	179	–	–
HP 4L	–	–	59	–	–	–	–	–	–	–	–	–
HP 3SI	–	–	69	–	–	–	109	–	–	209	–	–
HP 4SI	–	–	–	89	–	–	109	–	–	209	–	–
HP 5L	–	–	59	89	–	–	149	–	–	289	–	–
HP 5P	–	–	–	69	–	–	109	–	–	171	334	–
HP Design Jet 600, 650, 200	–	–	–	69	–	–	109	–	–	209	–	–
HP Deskjet 500, 500C, 510, 550,560	–	49	–	–	–	–	–	–	–	–	–	–
HP Deskjet 1200C, 1200C/P	–	–	–	69	–	–	109	–	–	269	–	–
HP Paintjet XL300	54	–	–	–	–	–	89	–	–	209	399	–
IBM Laser 4019, 4019E	–	–	–	–	–	139	–	–	–	–	–	–
IBM Laser 4029, 4037	–	–	–	–	–	–	139	–	–	–	–	–
IBM Laser 4039, 4079	–	–	–	69	–	–	139	–	–	209	–	–
Konica LP-3110	–	–	119	189	239	–	–	–	–	–	–	–
Lexmark, Optra L, LX, R, RX	–	–	–	–	–	–	89	–	–	171	334	699
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NEC 90, 290	–	–	–	119	–	–	–	–	–	–	–	–
NEC 95, 97	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400	–	–	–	79	–	–	–	–	–	–	–	–
Oki 400E, 400EX, 410E, 410EX	–	–	89	129	169	–	219	–	–	–	–	–
Oki 830, 840	–	–	–	109	–	–	–	–	–	–	–	–
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Panasonic 4410/4430	–	–	–	119	–	–	179	–	–	–	–	–
Panasonic 4450	–	–	99	–	–	–	–	–	–	–	–	–
Panasonic 4400/5400	–	–	89	129	–	–	229	–	–	–	–	–
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Sharp 9400, 9460, 9600, 9700E	–	–	89	119	–	–	219	–	–	–	–	–
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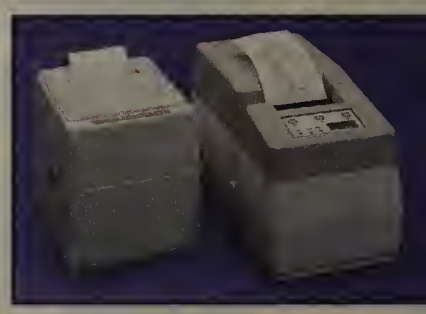

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951	Desktop computers	955	Accounting software	959	Multimedia products
952	Notebook computers	956	Graphics software	960	Utilities
953	Windows 95 software	957	Network/sharing products	961	Mail order companies
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fact: One out of six attendees at PC EXPO '95 came from companies with more than 10,000 employees. More than one in four were with companies employing over 2,500 people.

fact: More than 350 new products were introduced at PC EXPO in 1995, making it the place to see the newest software and hardware products.

fact: 95% of attendees at PC EXPO '95 visited at least one of its seven technology Pavilions. 78% visited at least three.

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@HOME

EDITED BY CHRISTINA WOOD

Consumer Watch

The Death of Free Support

BY ROBERTA FURGER

Listen carefully next time you're on hold for technical support. You may hear "Taps" playing.

After more than a year of grumbling about the high costs of providing technical support to home PC users, Compaq Computer has decided to quit giving it away. With the introduction of its new line (the Presario series 5200, 7200, 7600, 9200, and 9600), the Houston, Texas, company began charging customers for answers to *all* questions that aren't the direct result of a product defect.

That means unless Compaq determines your problem stems from either broken hardware or buggy Compaq software (such as Compaq's Media-Pilot and Tab-Works interfaces), the answer will cost you. The charge? Thirty-five dollars per question. That's right, *per question*. Don't think you'll be able to rattle off a bunch of queries for a flat fee. Marie Morris of Everett, Washington, tried that when she had problems with her Presario 9546. "They told me I'd have to pay another $35," Morris said.

Owners of earlier Presarios *should* still qualify for free hardware support, but have your credit card handy anyway: Under a policy instituted January 1, all callers to Compaq's lines must give a credit card number to be connected with a technician. At the end of the call, the techie decides whether the question is chargeable. And *that* depends, in part, on which Presario you own—basically, the newer your computer, the more limited your free tech support. With no credit card, your phone support is limited to Compaq's 900 line, which costs up to $30, at $2 per minute. Online support is available on all major services and on the Internet.

Warranty coverage has also changed with the new Presario line. On-site service is now limited to 90 days from the date of purchase. (Owners of earlier models got one year.) The remaining nine months of coverage are handled on a carry-in basis.

WHERE COMPAQ LEADS...

Although Compaq expects other PC companies to quickly follow its lead, so far only AST has shortened its warranty. Beginning with its spring line, all Advantage PCs come with a one-year warranty. Others are hinting at changes, though. NEC, for example, indicated that changes were afoot that would mean "less service and support for customers," according to a company spokesperson. Hewlett-Packard isn't making changes to its hardware support, but it will begin limiting free support on bundled software to 90 days after the first call.

For over a year, many PC companies have been charging for support on software —even when the package came bundled with the system. But it's often next to impossible to know what's causing a problem. Software conflicts are often disguised as hardware failures, and it can take days to figure things out. And what about out-of-date drivers or version incompatibilities? Compaq didn't have definitive answers to those questions, but according to Gus Kolias, Compaq's vice president of customer service, customers should expect to pay.

READ THE MANUAL, DUMMY

Driving the change is the way home PC owners are using technical support, according to Kolias. The lion's share of today's calls "go beyond the purview of why tech

PHOTO ILLUSTRATIONS: SYLVIA OTTE

support was put in place to begin with," he says. He adds that when customers call about how to use software or configure hardware, they aren't looking for technical support, they're looking for training. Compaq, along with just about every home PC maker, bemoans the seeming unwillingness of consumers to read a manual or access an online service to find an answer. "Because of the documentation, because of the time we take [simplifying] setup and use, we feel we have a pretty solid product," adds Compaq spokesperson John Sweney. "Buying a car and learning how to drive it are two different things."

Are consumers asking PC companies to act as tutors? There's no doubt that how-to questions make up a significant percentage of the calls to tech support lines. But a recent survey indicates that Compaq—along with other PC makers—shares some responsibility. In the NSI/Techtel Consumer Attitude Technology Survey last year, 41 percent of respondents found computer manuals "so confusing, they may as well be written in a foreign language." And 31 percent said they spend more time figuring out how to use a computer than using it.

The latter statistic would certainly ring true for Presario owners who've been posting messages on Compaq's America Online forum. Many express frustration both with Compaq's decision to take credit card information up front and with its jam-packed phone lines. Although the company is pushing customers to use its online support, more questions are posted than answers (see box below, "Get the Message, Compaq?"). Compaq's literature promises a 24-hour turnaround on all questions. Kolias admits it's more like 48, and notes, "We haven't always met that."

EXPENSIVE PROPOSITION

No matter how you slice it, providing technical support and service is an expensive proposition. And just like software developers before them, computer manufacturers are scrambling to cut costs without losing customers. Charging for answers to tutorial questions seems reasonable and justified, but Compaq's new policy of charging unless the product is defective goes too far.

PC manufacturers have made systems much easier to set up and use, but personal computers are still too trouble-prone for companies to sell consumers a $2500 machine and then tell them, "you're on your own." At a minimum, they should provide 90 days of free technical support to help customers get up and running.

The history of computers is full of examples where Compaq led the industry in innovations. Let's hope this isn't one of them.

As always you can contact Consumer Watch *with questions or problems. See page 14 for contact information.*

GET THE MESSAGE, COMPAQ?

A sampling from the more than 150 messages posted on Compaq's Presario message board on America Online on Saturday, January 27, and Sunday, January 28. (Similar messages were posted on several of the company's other message forums.)

- "I am so **incredibly frustrated** with my computer... I am not a computer expert. I need help..."
- "We are **very discouraged...** We bought our computer on deferred billing and haven't paid for it yet. Can anyone at Compaq give me a good reason why I should not simply pack it up and take it back?"
- "I cannot get through to technical support. I wrote a letter to Compaq in Houston and **never got an answer.** I heard Compaq had the best technical support, and I have yet to find it."
- "How many times do I have to post this message?"
- "Technical support from Compaq is **nonexistent.**"
- "If you can take the computer back to your dealer, I'd do so. Compaq will charge you **$35 for each question.**"

TOP: J.D. KING; RIGHT: CHIP WASS

Feedback

Devious Operation

We have received dozens of calls about an ad in our March issue for a company called PC Distributor in Hallandale, Florida. The prices for hardware in the ad looked too good to be true, which led callers to wonder if PC Distributor was legitimate. Since the company would not accept credit cards, we advised callers not to buy from it. Unfortunately, some of those who called us had taken the bait and sent a check. Those people said they never got their merchandise. PC Distributor has since stopped answering its phones. U.S. Postal Service Inspector Tom Taylor guesses the perpetrators are long gone. If you sent a check to PC Distributor or have any information, write to Fraud Complaint Section, Postal Inspection Service, 222 S. Riverside Plaza, #1250, Chicago, Illinois 60606-6100. The best cure for this kind of crime is prevention: When you buy through the mail, use a credit card.

TAKE NOTE: 21 percent of respondents to a recent survey agree computers could take over the world. 17 percent feel their computer is out to get them. But 50 percent can't imagine a world without PCs.

Source: The NSI/Techtel Consumer Attitude Technology Survey of 1000 U.S. households.

Online Charges

Customers of Pipeline, a PSINet company that provides Internet access, encountered a problem after signing up for a trial period. Several people complained to us that after terminating their accounts with Pipeline, they couldn't get the company to stop billing them. Brian Muys, manager of corporate communications for Pipeline, admitted that the company was suffering from an overzealous computer glitch that continued to bill customers even after accounts were terminated. He says staff are now aware of the problem and are working to delete canceled accounts manually. If you are experiencing a

Cybertoys for Everyone in the House

Shady shades, car shark advice, spud savior.

PHOTO: ROBERT CARDIN; ICONS: JOHN HERSEY; ILLUSTRATION TOP: J.D. KING; RIGHT CHIP WASS

PASS THE GLASSES

Chinon's CyberShades look like the 3-D glasses used for watching 1950s horror flicks. In fact, these are the cheapest, lightest virtual-reality headsets yet devised. Simply plug them into your parallel port and load a game from the enclosed CD-ROM; LCD shutters in each lens open and close to create the illusion of a third dimension. And they actually work—provided you don't mind chunky 320 by 200 resolution, annoying flicker, and bouts of vertigo. At press time the Shades supported only the games in the box—limited versions of Wolfenstein 3D, Descent, and four shareware titles. Though more are on the way, CyberShades give you mostly kitsch for your cash; you'd be better off watching *Creature From the Black Lagoon* on the Sci-Fi Channel. —*Daniel Tynan*

- **CyberShades** $199.95 list; Chinon America; 800/441-0222, 310/533-0274. Grade: C-

  Reader service no. 666

DRIVER'S HOT SEAT

Ever shop for a new, or worse, used car? Then you've endured the confusion, even terror, that accompanies the process. *Consumer Reports* comes to the rescue with a manual that steers you toward the safest and most economical automobiles on the market. The prospective car buyer will find, among other handy features, a glossary of car terms; advice on buying a sound system; detailed data on bodies and engines; and *Consumer Reports'* objective evaluations of 7300 cars, minivans, pickups, and sport utility vehicles manufactured from 1987 to 1996. Best of all, interactive videos alert you to sales lingo and techniques. In fact, a spin with this title should put you in the driver's seat so you're not tempted to cave under high-pressure sales techniques. —*Leslie Crawford*

- **Consumer Reports Cars: The Essential Guide** Price: $19.99; Creative Multimedia; 800/331-1368, 503/241-43351. Grade: A+

  Reader service no. 667

SPUD ALERT

Ever since they saw *Toy Story*, my kids have been wild about Mr. Potato Head. So when I came home with the new CD-ROM game, Mr. Potato Head Saves Veggie Valley, they tore open the shrink-wrap and begged me to let them play. The game did not disappoint. Kids ages 3 to 7 assist Mr. Potato Head and his daughter Sweet Potato in their quest to move a menacing rain cloud

FEEDBACK CONTINUED

problem, call Pipeline at 717/770-1700, ext. 5140. Bear in mind that it could take two to three billing cycles before you get the problem cleared up.

Nesting Network

If your idea of the perfect weekend is to strip the wallpaper off the guest room and do some repainting, then you'll find lots of advice and plenty of kindred souls in the new America Online forum HouseNet (keyword: HouseNet). You can chat with other homebodies and read articles on how to install ceiling trim, detect lead paint in your home, or apply fancy paint finishes, as well as on hundreds of other topics. You can even search for vendors of home repair products. Though you can't buy stuff from this forum, you'll be able to find addresses and phone numbers.

Stuck With It?

Jeffrey Larson of Vashon, Washington wrote us about a problem with his MidWest Micro laptop, which he chose based on a *PC World* review. He owned the computer for over a year, and it didn't work for seven months of that time. The company promised him a replacement model but—after waiting three months—Larson wrote to us asking if we could get him a refund. We contacted MidWest Micro on his behalf and were told that refunds can be issued only within 30 days of purchase. The company did, however, promise to send Larson a newer model laptop and renew his warranty for a year. Larson was unhappy with this arrangement. He wanted his money back. So we broached the question with MidWest Micro once again. This time the company agreed. More a year after Larson had purchased the computer, he got his refund.

By Christina Wood

TAKE NOTE: The Consumer Information Center has a BBS (202/208-7679) where you can download more than 250 free federal publications on everything from eating right to buying a house.

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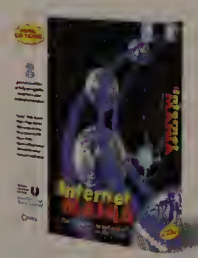

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from over the county fair to Veggie Valley, where little spuds are dying of thirst. By keeping a sharp eye on their surroundings, kids pick up all the stuff they'll need to lasso the cloud and save the valley. Our favorite part: You can dress up Mr. Potato Head and Sweet Potato in crazy costumes, then print their pictures. —*Roberta Furger*

- **Mr. Potato Head Saves Veggie Valley** $39.99 list; Playskool/Hasbro Interactive; 800/638-6927. Grade: B+
  Reader service no. 668

FOR GIRLS ONLY

Boys, clothes, makeup; boys, friends, and more boys. That's what McKenzie & Co., a CD-ROM game for 10-to-15-year-old girls, is about. In this story, players select from one of two characters: Kim, a "star gymnast and cheerleader," or Carly, "aspiring actress... bohemian...dedicated friend." Then the girls pick a guy to pursue (four of this program's six discs are devoted to these hunks). Players watch video clips of the girls and their friends—at school, at the mall, at slumber parties—then choose what to say and how to act. Walk right up to the cute boy, or play shy? The story develops according to these choices. Though the game attempts to discuss lofty issues, like being true to friends and family, it's about boys. Isn't there more to being a teenager than whether to date the cowboy or the GQ wannabe? —*Roberta Furger*

- **McKenzie & Co.** $50 street; Her Interactive; 800/561-0908, 505/880-1718. Grade: D+
  Reader service no. 669

WHERE THERE'S A WILL

Only vampires and movie stars are immortal; the rest of us need to make other arrangements. Thankfully, there's WillMaker 6.0 from Nolo Press; it makes estate planning (wills, living wills, final wishes) almost painless. WillMaker's Q&A format has been expanded in this new version to help those in legally unsanctioned relationships, such as unmarried or same-sex couples, create detailed wills. There's also more flexibility in naming alternate beneficiaries and executors, setting up trusts for your kids, and making bequests. WillMaker 6.0 is easier than ever to use, with on-screen legal advice and context-sensitive help. Inconveniently, you can't import wills from WillMaker 5.0 into this new version. —*James A. Martin*

- **WillMaker 6.0** $39 street; Nolo Press; 800/992-6656, 510/549-1976. Grade: A-
  Reader service no. 670

VOLCANIC INTERACTION

Join photojournalist Roger Ressmeyer on assignment with *National Geographic* as he searches the globe for erupting volcanoes. Narrated by actress Helen Mirren, this CD-ROM weaves together stunning photographs, maps, paintings, and artifacts to help you relive his journey. You can view Ressmeyer's photographs volcano by volcano in a customizable slide show; meet the people living near active volcanoes and hear their survival stories; delve into the history of volcanoes from the 1700s, and learn about the scientists who pioneered volcano research. An extensive reference section with over 100 entries on scientific terms and the text of historical articles makes the experience educational. Even if you're not a raving volcanologist, you'll be captivated. —*Aoife McEvoy*

- **Volcanoes: Life on the Edge** $50 street; Corbis; 800/246-2065. Grade: A
  Reader service no. 671

THE NAME IS SPADE

Police work can be fascinating—solving crimes, piecing clues together, getting confessions—good stuff. SFPD Homicide: Body in the Bay lets you be a detective in the San Francisco Police Department. Your first assignment is to solve a murder—and you've only got two weeks. You interrogate witnesses by clicking on them, then sort through the evidence, looking for any kind of clue that might point to a suspect. A few drawbacks: Every time you start the game, you have to watch the introduction, and it's easy to get stuck bouncing around town, looking for clues and asking the same old questions. —*Gabrielle Mitchell*

- **SFPD Homicide: Body in the Bay** $39.95 street; Grolier Interactive; 800/285-4534, 203/797-3530. Grade: B-
  Reader service no. 672

Hot lava tumbles into the sea on the coast of Hawaii's Big Island.

Volcanoes is an explosive tour of the globe.

RABBIT REDUX

Remember that dog-eared collection of Beatrix Potter stories you treasured as a kid? Well, Peter Rabbit and Benjamin Bunny have hopped onto CD-ROM, bringing with them much of the charm of the original books. The classic illustrations translate well to the computer, retaining a warmth as appealing to adults as to the 3- to 7-year-olds the disc targets. Highlighted text appears beneath each scene, and kids can explore Peter's world, hear nursery rhymes, and play games by clicking interactive hot spots. Unfortunately, the hot spots are relatively sparse, and the games—primarily simple picture identification and hand-eye coordination exercises—are likely to bore older kids. It doesn't help that performance on both a Pentium-75 and a P-90 was slow as a tortoise. —*Anne Kandra*

- **The Adventures of Peter Rabbit & Benjamin Bunny** $35 street; Mindscape; 800/234-3088, 415/897-9900. Grade: B-
  Reader service no. 673

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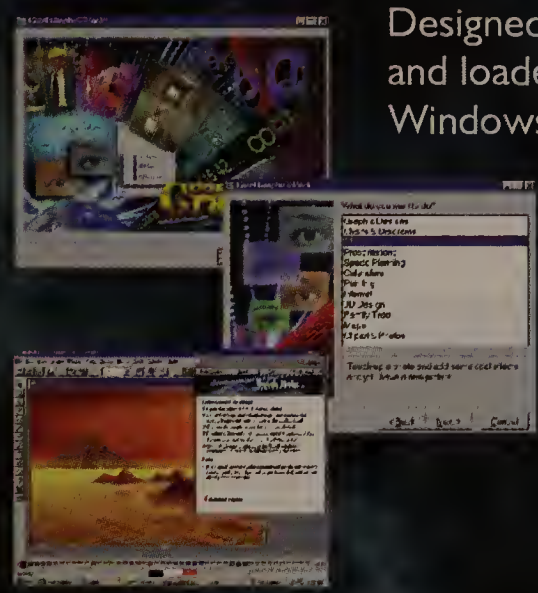

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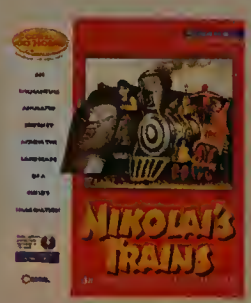

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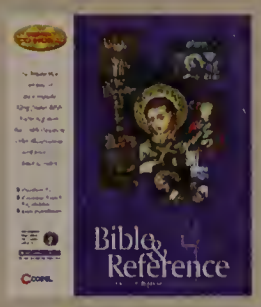

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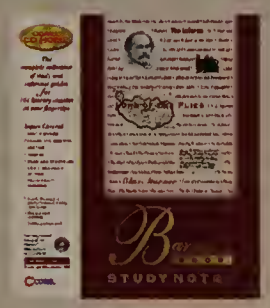

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Circle 67 on reader service card

Online Vacations

The information highway meets the real one.

BY LINCOLN SPECTOR

I need a vacation. Unfortunately, I have to write this column, so I'll have to postpone my trip to Pago Pago. In the meantime, I'll console myself by helping you plan your vacation. Some of my advice might even make your sojourn cheaper and more enjoyable.

If you're a Net head, stop first at Yahoo (http://www.yahoo.com). Once there, select *Recreation • Travel.* You'll find links to travel agents, airlines, resorts, and other fun stuff from cruises to recreational vehicles. If you're on America Online, click the *Travel* icon on the Main Menu opening screen or enter the keyword travel for a list of resources and services. CompuServe and Prodigy have their own travel sections (go travel on CompuServe; click the *Travel* button on Prodigy), but the ones on Yahoo and AOL are more comprehensive.

If you want real-life stories from other world travelers, Internet newsgroups are a great place to get advice, answers to your questions, and even leads on swapping homes with residents of foreign lands. Go to DejaNews (http://dejanews.com), set a filter that will search only the rec.travel.* newsgroups, and look for some appropriate words. For instance, if you want to know about hotels in Toronto, search for **Toronto & hotel** (that ampersand is important; without it, you'd get every listing with *Toronto* or *hotel*, which would provide you with reading material for the next five years).

If you're looking for something cheaper than a four-star hotel (but without fleas), you can probably find it through your modem. For instance, CompuServe offers an easily searchable, comprehensive database of bed-and-breakfast establishments throughout the United States and Canada, Lanier Bed & Breakfast Database (go inns). AOL provides a similar service, Bed & Breakfast U.S.A. (keyword bed & breakfast), although it's not as easy to search and didn't seem to list as many places.

There's no comprehensive list of lodgings on the Net, but many hotels and B&Bs have their own Web pages, and you can usually find them by location. Check out *TravelAssist*'s The Register (http://www.travelassist.com/reg/reg_home.html).

FLYING WRONG

When it comes to picking a flight and buying tickets, however, the online world is of little help. Over the past two years, I must have tried a dozen times to make airline reservations online, and I always find myself going back to the phone. Maybe I'm a Luddite, but I just don't enjoy waiting while two computers talk over a slow modem line to get information a travel agent could have given me in half the time. And travel agents are usually better at finding bargains.

All the major airlines have their own Web sites, which are about as well thought-out as their coach breakfasts. On the United Airlines site (http://www.ual.com), for instance, you can read about the wonderful new way you can buy tickets online. But nowhere on the site can you actually *buy* those tickets! That requires either special software or a CompuServe account, a fact that the Web site never actually explains.

I did find two services that are possible exceptions: The Travel Discounters Web page (http://www.traveldiscounters.com) and Arthur Frommer's Secret Bargains on America Online (keyword Arthur Frommer). Both of them promise extra low prices, which they obtain through wholesalers and "secret" sources. Of course, I wasn't actually able to test them. (I failed to convince management at *PC World* that, in the interest of research, the magazine should reimburse me for a trip to Maui.) But they did quote prices for a San Francisco to New York round-trip that were $75 to $150 less than what any travel agency would give me. And each site is filled with suggestions and recommendations for low-cost travel that make them worth checking out even if you don't buy your tickets there.

My best advice for enlisting your PC to help make your vacation enjoyable? Leave the computer—and the modem—at home.

Lincoln Spector is a senior associate editor for PC World. *See page 14 for contact information.*

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Cheap Speedups

There's a gold mine in your garage...

BY STEVE BASS

If you have a computer, you probably want more RAM. My mother did. But instead of schlepping her system to the vendor for the memory upgrade, I decided to save some money and do it myself. I'm glad I did, because I made a great discovery: With the right gadget, you can turn old RAM from an obsolete system into new RAM for your current one—at a cost that's next to nothing.

I've always been reluctant to mess with my system's RAM. Of all things about computers, RAM jargon has been the most confusing. But as it turned out, the hard part was figuring out what my system needed. Adding the new RAM was easy.

A few basics: Your system memory is almost certainly in standard SIMMs, little add-in cards that go in their own sockets. Pre-1993 systems usually have 30-pin SIMMs, and most later models, 72-pin SIMMs, which generally hold more RAM. The 30-pin SIMMs are about 3½-inches long, with one solid row of pins; 72-pin SIMMs are a touch over 4 inches and have two sets of 36 pins. You generally have to upgrade 30-pin SIMMs four at a time; depending on your system, 72-pin SIMMs can be upgraded one or two at a time.

IT'S A GARAGE SALE

The most expensive memory is shrink-wrapped SIMMs that you buy at a computer store. The cheapest is memory you already have. There's a chance you have a ton of memory in your garage just sitting around and gathering dust. I did—16MB worth of 30-pin SIMMs, conveniently located in two ancient 386 computers.

Well, you say, that's all very fine if your current computer uses the same 30-pin SIMMs as your old one. But you can't put 30-pin SIMMs in a 72-pin socket.

And I say: Oh yes, you can. I did it—with two converters, each of which transformed four 1MB 30-pin SIMMs into one 4MB 72-pin SIMM. The total cost: $58 for an 8MB upgrade. Now we're talking discount!

A few things to remember: First, buy converters with buffers. With at least four SIMMs being addressed all at once, the buffer regulates the chips, preventing overloads. A converter that's simply a pass-through—I saw one at a swap meet for $17—may lead to system crashes or worse, data corruption.

ALL THE RAM THAT FITS

And make sure the converter fits in your PC's case. Converters and computers come in dozens of shapes and sizes, and not every pair is a fit. For example, there's a $59 converter that accepts eight 30-pin 1MB SIMMs, making it into one 8MB 72-pin SIMM. That's big, and it wouldn't fit into my mother's system. The best bet: Call the company, get the measurements of their converters, and open your system's case, ruler in hand. Then make sure the company you buy the converter from has a flexible return or exchange policy.

The last issue is the speed of your old RAM. Even though memory itself doesn't wear out, chips slower than 80 nanoseconds (the higher the number, the slower the speed) aren't worth using anymore.

If the whole idea seems a bit intimidating, you can pay a little more to get a new guarantee with your old chips. A friend of mine sent his 30-pin SIMMs to a company called Autotime, which removed the individual memory chips, tested them, and remounted them on 72-pin SIMMs. Because no extra gadget was involved, it made for a cleaner installation into the computer and some peace of mind. The cost? $70 to transform four old 4MB 30-pin SIMMs into one new 72-pin 16MB SIMM—versus $500 or more for new RAM. And Autotime provides a one-year warranty for the SIMM.

Of course, it's best not to need to add RAM at all. The next time I buy my mother a new system, I'm going to make sure it has 32MB of RAM to begin with.

- **SIMM4 Recycler** $29 (conversions vary); Autotime; 503/452-8577, 503/452-0208 (fax); http://www.teleport.com/~autotime
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- **SIMMStack** $39.95; Sermax; 800/209-7126, 212/410-1597, 212/410-0452 (fax); http://www.simmstack.com
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- **Z-RAM Memory** $155 for 4MB; Camintonn Corp.; 800/368-4726, 714/454-1500, 714/830-4726 (fax)
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Contributing Editor Steve Bass is a licensed marriage and family therapist and president of the Pasadena IBM Users Group. He can be reached on PC World Online. See page 14 for contact information.

TALK TO US: You can e-mail the editors of the PC World @Home section (home@pcworld.com), or write to us at 501 Second St. #600, San Francisco, CA 94107. We're eager to hear your responses and opinions about any topic related to home computing.

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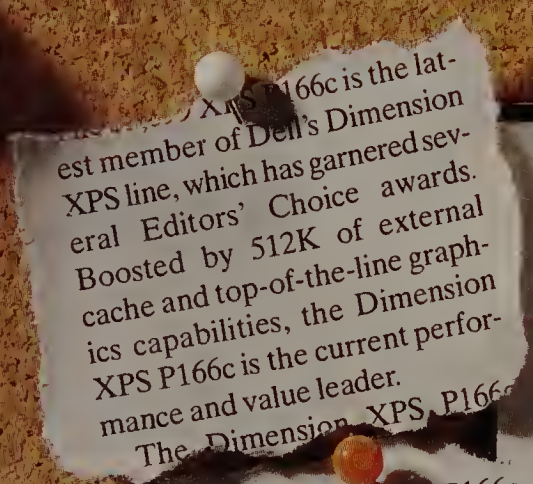

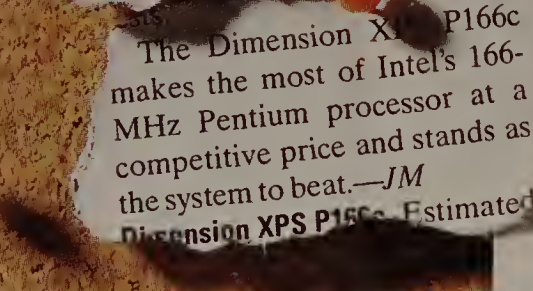

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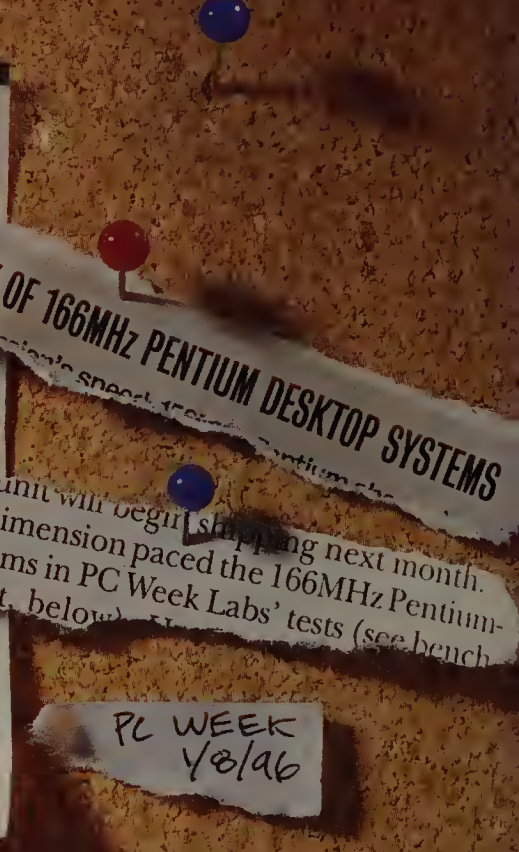

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